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ORIGINAL ARTICLES.

BRAIN SURGERY, WITH REPORT OF NINE CASES.

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My subject might perhaps have been named more appropriately cranial surgery, as I wish to report nine cases of injury to the head; all of them, however, interfered with the function of the brain, and in three of them there was actual destruction of brain tissue. Of these nine cases, four recovered completely, one improved so much, that we have reason to believe that he will in the course of time, recover sufficiently to be of some use to his family. Four died. As we have yet much to learn concerning the diagnosis and management of injuries to the head, and as all of them have their own peculiarities to a certain extent, it seems to me an accurate report of such cases will be of advantage to us; and undoubtedly we will have to depend largely upon clinical experience for the advancement of this work in the future. This, then, is my apology for occupying your valuable time:

Case 1.—Boy aged 10 years, fell during February, 1880, from a depot platform, striking his head against the corner of a fire-box of the wheel of a freight car. I saw him an hour later; he was in a comatose condition, motionless with a large, full, slow pulse, and sterterous breathing. There was an extensive contused and lacerated wound of the scalp, over the middle portion of the right parietal bone exposing the skull. After thoroughly cleansing the wound, having shaved the hair from the scalp, I enlarged the opening and found a depressed, stellate fracture. The skull was unusually thick for a boy of his age, 3-16 inch. The fracture presented five points at its center, all coming together, converging like the spokes of a wheel, at the center of an irregular circle two and a half inches in diameter. There were therefore five irregular triangular pieces of bone. Each triangular segment was attached at its base, but all of them had their outer table cracked where they joined the body of the bone. Their apices were depressed fully a third of an inch. In order to elevate the pieces I trephined through the base of one of them, then succeeded readily in replacing all. The dura mater was contused, cerebral pulsation absent before the operation. Restoration of the bone to position was followed by immediate return of functional action. The little fellow talked freely and told how he fell. The scalp was stitched with silk, dressed antiseptically; the patient was left in bed, in a quiet room for about ten days. The wound healed by first intention. The button of the bone was not replaced. The boy is well.

Case 2.—Boy 7 years old, October, 1889, fell from a loft in a livery stable, striking upon a heavy plank floor with the back of his head. Was carried home in an unconscious condition; saw him an hour and a half later. His pulse was full and large, 68. Breathing sterterous; pupils dilated. There was a large swelling over the occipital bone, above the superior curved line, extending two inches to the right and one inch to the left of the occipital protuberance. The scalp was severely bruised and raised by a hematoma. Anæsthesia was unnecessary. I cut through the scalp and periosteum making a curved incision two inches long with its convexity downwards. The blood immediately rushed out; the patient moved his limbs at once, gave a cry and waked up as from a dream. I quickly examined the skull and found a transverse crack two inches long, about half an inch above and running parallel with the deep curved line of the occipital bone, extending more to the right than left side of the median line. The thin bone had been depressed by the blood between it and the periosteum, and had sprung back into position when that pressure was removed.

Ten minutes after the operation the boy related how the accident occurred. Within a week he was again playing upon the street.

Case 3.—Wm. —— aged 11 years, while visiting in the country a hundred miles from Chicago, July, 1887, fell from an apple tree a distance of twelve to fourteen feet. His father having been telegraphed for, came to have me accompany him to see his boy. Not finding me at home, he took another surgeon with him. The city surgeon arrived at the patient's bedside ten hours after the accident occurred. In the meantime, the mother who was with the boy, called a local doctor who found a large oval swelling in the left temporal region, together with contusion of the scalp here. The boy was unconscious. The physician said he was suffering from concussion of the brain; did not think there was a fracture. The Chicago surgeon agreed with the attendant, concluded that there was nothing to do except to let him rest and applying a liniment to the wound, returned home. The patient remained unconscious for forty-eight hours, then becomes semi-conscious; at the end of a week he "woke up" as his mother said. During this week his bowels were constipated, and urine had to be drawn. After six weeks the child was brought home and I was called to treat him for a headache. At this time a ridge could be plainly felt in the middle of the fossa of the squamous division of the temporal bone, running parallel with the zygomatic process. What a chance the surgeon missed here of making a brilliant cure with one stroke of the knife! Undoubtedly the large swelling in the region was caused by a rupture of one of the deep temporal arteries or from the bone. The blood was boxed in by the unyielding temporal fascia and pressed the cracked bone against the dura mater and brain. The pressure symptoms disappeared with the absorption of the clot, the bone retaining sufficient elasticity to spring out. At the time of my visit, the child was afflicted with a slight frontal headache and enteritis; the parents imagined that the injury might have had some relation to this condition, which fortunately proved not to be the case, as he made a prompt recovery.

Case 4.—A gentleman aged 45 years, engineer, was

found lying on his back on the floor, in close apposition to the cube-shaped stone supporting a portion of a stationary engine, with a step ladder standing near. He was unconscious when a homeopathic physician came to see him. He was placed upon a stretcher, and examined by the doctor who found a scalp wound one and a half inches in length over the right half of the occipital bone, which he washed, stitched and dressed. The patient was taken home and looked after by this physician. It happened that this man carried an accident insurance policy, and in the natural course of events the insurance company sent their surgeon to look after the interests of the patient, or more properly stated, their interests. The company's surgeon called twenty-four hours after the man was sent home. Not knowing who or where the attending physician was at that time, he asked permission of the man's wife in behalf of the company to see the patient. The permission was granted. The doctor quickly examined the case. Found pulse 48 large, full, laborious. Pupils dilated widely. Sterterous breathing. The bladder filled to distention. He did not stop to open the bandages, but at once drew off a quart of urine from the bladder, and went in search of the doctor. Did not find him until the next day. On the fourth day the company's surgeon suggested a consultation be held with a regular surgeon, promising that the company would bear the expense. The attendant was willing to have a homeopathic surgeon. In order to pacify him the company's physician said, you may have your homeopath, but let me bring a "regular surgeon" and the company will pay both. He finally consented to let the company's doctor bring a surgeon to see the case with him. The doctor called me on the sixth day; I found a pin head opening in one end of the scalp wound, through which my probe entered readily, and I felt the rough outlines of a fracture. Gave it as my opinion that there was either a clot or depressed bone causing the symptoms. The homeopath's attention was called to it, but he claimed that there was no fracture and held a consultation with one of his guild, who agreed with him. The man's wife said she wanted her husband let alone with her homeopathic doctor and wanted no more physicians to trouble him. Of course I advised operation, but at the same time was guarded as to the prognosis, saying the clot might be absorbed, or possibly the bone might spring back into position and the patient make a recovery. If it was a clot there would be more hope, but it would take considerable time. In the meantime, however, I felt he was being permitted to take too great a chance. Be that as it may, two weeks later Dr. J. R. Corbus (who represented the company) said that the patient seemed to be gradually improving, although his urine still had to be drawn. Six weeks later was able to sit up. His right eye was much weaker than the other. In fact he could not see clearly with it. Motion in one leg was somewhat impaired. After six months he began to walk about, toes of one foot dropped, causing a stumbling motion. The case came to court within a year, as the company refused to pay the homeopathic attendant, claiming that an operation would have resulted in a more rapid cure and that they had been compelled to assume a greater risk than was necessary by the refusal to have proper surgical aid. The attendant made his speech claiming to have cured the patient medically, while Surgeon Schaefer wanted to use the knife. Dr. J. R. Corbus being called to witness stand, was asked what he thought about the case. His reply was: "By the grace of God the patient got well, homeopathy notwithstanding."

Case 5.—A Mr. T. aged 50 years, manager of railroad car shops at the city limits of Chicago, rode home in the baggage car of an express train, as was his wont, at six o'clock one July evening of 1890. The rails spread while the train was in motion. The gentleman had been sitting in an arm chair, facing the corner of a safe, perhaps a yard distant. As the car left the track he was thrown forward from the chair and struck the corner of the safe with his forehead. The accident occurred about seven blocks from the man's home. He was momentarily stunned, but soon picked himself up and walked home unattended. I saw him an hour later in emergency. His left eyelid was black and swollen. It was seen that the frontal bone was fractured vertically in its left half, from near the inner end of the orbital arch upwards. The left side of the forehead was flattened. He had an unusually large frontal sinus, which made the wound look as if the anterior wall of the left sinus was pressed in. As the man was perfectly rational, showing no symptoms whatever of brain disturbance, it seemed altogether probable that the outer table only was broken. Still I was in favor of cutting down immediately to examine the bone and do what might be necessary. The family were opposed to such action. It was therefore deferred. The next morning a consultation of surgeons was held. The patient was still rational, clear headed, having use of all of his functions, with no indication of compression. Six days later I was invited by the surgeon in charge, my friend Dr. L. McArthur (by whose consent I report this case), to assist in elevating the bone. A change had occurred on this day. His speech was faltering, deglutition difficult, pulse weakening. He was somnolent. An incision revealed the following:

There was a vertical fracture towards the inner end of the left orbital arch extending towards the coronal suture. The external angle of the frontal bone was broken loose from the malar articulation, while this angle had been driven inwards two-thirds of an inch or more. With great difficulty Dr. McArthur pried the angle back into position. Of course this depression implied a fracture of the orbital plate of that side. Two days later I made the autopsy and found what the illustration shows. A transverse fracture extending from the external process of one side to the other, *across the base of the skull*, passing through the orbital plates near the lesser wings of the sphenoid and through the back part of the cribriform plate of the ethnoid. Connecting the ends of the fracture there was a complete fracture of the vertical portion of the frontal bone running parallel with the coronal suture. In addition to these, there were the vertical fracture alluded to connecting with the transverse fracture on the forehead; and three fractures through the left orbital plate, two extending from orbital arch to the transverse fracture within the skull, the other half way back. The triangular shell thus produced at the outer angle of the frontal bone was driven almost an inch into the left frontal lobe. Here the autopsy revealed a large cavity in the brain which had been occupied by the bone. There was a clot in the channel of the cavernous sinus. With this extensive traumatism there were no symptoms of brain injury present until the sixth day.

Case 6.—Boy, W. L., aged 17 months. While playing upon the porch at the back end of a flat, sixteen feet above the ground, suddenly fell down stairs, probably rolled two or three steps, fell seven feet striking the top of a fence with the crown of his head, and dropped from the fence to the ground below five feet which was covered with ice. There he was found a half minute later, lying flat upon his back and head. He was carried to his bed, and a messenger sent for me. A physician happened to be in the building at the time. He was at once called; after looking the child over concluded he was suffering from concussion of the brain. A half hour later I came to him. Examined the child critically. Found he could move his limbs. His pupils responded to the light slowly. For one instant only his left eye was thrown off of parallelism with the other. It quickly moved

into line, however. This at once made me suspicious of brain injury. I then ran my hand over the top and back of the head. The occiput was flattened, while in front of it there was a prominence. The child was drowsy, still could be easily awakened, and had control of its functions. I next walked out to the porch to see how far and where the boy fell. The extent of the fall was so great, that I felt convinced that the skull must be badly fractured. In the absence of grave pressure symptoms, it seemed unnecessary to operate at once. I therefore advised warm fomentation and sedative treatment. Gave it as my opinion that the skull was extensively fractured and said that at the first instant when severe brain symptoms appeared, such as convulsions or paralysis, I would cut through the scalp and do what seemed best. Twenty-four hours later there occurred clonic spasms at the left angle of the mouth. I at once ordered a barber to shave off the hair preparatory to operation. Chloroformed patient; scrubbed head with soap and water; washed with bichloride and ether. Cut through the scalp at a point corresponding to the upper portion of right fissure of Rolando; found an irregular fracture extending to the right and left; followed it up in both directions. It extended to within one-half inch of the right ear, and to within one inch of the left ear running across the back part of both parietal bones. A peculiarity which interested me greatly was the fact that the borders of the broken bone were separated *one-eighth of an inch* which explained to my mind the absence of pressure symptoms from the beginning; the open seam of necessity increased the intracranial area. At the back part and middle the bone was considerably depressed for distance of two inches; at the right side in front of the location for the fissure of Rolando I trephined and found a tablespoonful of clotted blood beneath the dura mater, which membrane was lacerated here. The dura mater was torn in several places and at the middle of the wound, brain tissue lay loose on the seam of fracture. After thoroughly cleaning the entire wound I lifted up the depressed bone, stitched the dura mater, brought the edges together through the entire length of the wound, placed a small drainage tube in two places which were carried through small trephined openings of the skull. Dressed antiseptically. Boy's eyes brightened, responded quickly to light. Improved for twenty-four hours, when his pulse and temperature rapidly crept up and he died on the fourth day, of meningitis.

Case 7.—Wm. N., aged 22 months. Was called to treat this child for a headache in the evening of the fifteenth day. His parents said that he had been sick for about two weeks; the headache came every afternoon at about 2 o'clock, and left him towards midnight. The pulse was small and rapid, 120; temperature 100°F. Eyes responded to the light. The head ached all over the frontal region. Tongue heavily coated. Nothing was said about traumatism. Bowels were constipated. Prescribed bromides, cathartics and quinine. Called the next day at 7 o'clock P. M., found the patient feeling better, pulse a little stronger. Temperature 99° F. Continued bromide of potassium. Third visit, fourth day, 9 A. M. He was slumbering; every now and then he cried out in his sleep. The cry was shrill, as if caused by sharp pain. This set me to thinking. I at once asked the parents if their son had met with an accident recently. They thought not. I asked the question again, saying little ones frequently stumble and fall. The mother then spoke up saying that she remembered that he fell about two weeks ago, but there was no bruise upon him. My next question was who saw him fall? "Freddie, his 12-year old brother." The brother was called. In reply to my question he said that he played with the patient two weeks before, his brother clinging to his neck and back while he sat on the edge of a lounge; he ducked his head pretending to throw him over his head; did this once too often when the latter slid to the floor head first, striking heavily upon the cranium. This was sufficient. I examined the skull carefully, found a very slight unevenness over the coronal suture of the left side of the head, scarcely perceptible; pressure upon the point caused him to cry the same shrill cry as heard before. Pressed upon a corresponding point of the opposite side but elicited no response. There was no longer any doubt in my mind as to the cause of the origin of the headache.

I immediately informed the father that an incision through the scalp was indicated, to explore the skull and possibly to lift a depressed bone. The father at once repelled the idea, claiming that the child had the headache nearly a week before the accident occurred. Having no time to waste, I advised him to call in another surgeon, and if the latter should agree with me I would go on with the operation; if there was a disagreement he could let the other surgeon take the case. Two surgeons were called, Dr. I. N. Danforth and Dr. McDonald. After hearing the full history of the case and having examined the head, they concurred with me. By this time the boy was very weak; pulse 130, small, temperature 101°. In the meantime the head had been shaved by a barber. I cleaned the scalp and cut down to the bone, making an oval flap. Found a slight fossa at coronal suture, an inch to the right of the median line; the teeth of the suture could be seen obliquely placed. Removed a $\frac{3}{4}$-inch button. The cerebral pulse was absent. The dura mater looked black. Aspiration drew off a teaspoonful of serum. Opened the dura mater; a tablespoonful of cerebral fluid escaped, with considerable lymph and clotted blood; pulsation was now normal. There was a circumscribed leptomeningitis present. It was thought advisable by all of us to leave a small gauze drain in the wound. I stitched the dura mater and scalp with fine silk; applied usual antiseptic dressings. The headache was relieved; patient's eyes grew clearer, responded promptly to the light. After thirty-six hours his temperature ran up to 102° F.; two days later he died. There was no pus in the wound. He died of leptomeningitis.

Case 9.—Wesley Hospital Record.—Mr. K., aged 47 years. Father died of apoplexy. Mother lived to old age. Lost a sister aged 30 years from consumption. He enjoyed good health up to two years ago. During the fall of 1887 he was sand-bagged and robbed on the street while going home in the evening. Was struck on the head with some metallic instrument. The scalp was torn open to the extent of about an inch, over the upper and middle part of the right parietal bone, extending outwards from near the median line. He was stunned for a few minutes only. The wound was dressed by his wife; it healed in a few days. The patient went to work the morning after the accident and felt as well as usual, barring a little tenderness about the wound. He had forgotten all about this important incident until reminded of the presence of a scar upon the scalp. Two years ago his limbs swelled and a physician said he had Bright's disease. At the same time his head troubled him. Was afflicted with vertigo. There was a constant headache and tenderness on the right side of the skull. After a few weeks of suffering he was suddenly seized with "spasms" of the left side of his face and of the left arm and leg. These spasms began in the left fingers, extended up the arm to his shoulder, next over the entire left leg. His head turned to the left side, and there was a constant twitching at the left angle of the mouth. Lost the use of his limbs for several days after the attack. Could not talk well afterwards; his memory became impaired and sensations were dull on the entire left side from that time on. The convulsions came five times—several months apart—within two

years. Each successive paroxysm was longer and more severe than the preceding one. Had the last attack of the five before entering the hospital a few days before Thanksgiving, 1892, at which time he was almost comatose for thirty-six hours. Since coming here, December 21, 1892, the convulsive seizures have occurred on an average about once in twelve days.

Symptoms during the Seizure.—Clonic convulsions beginning in the second finger of the left hand. Immediately after the "initial" symptom appeared in the finger the convulsions extended to the other fingers, wrist, arm and shoulder in rapid succession, also to the muscles of the face and leg. Teeth came firmly together, causing a "gritting" movement; several times the tongue was bitten. These symptoms of irritation were followed by a period of unconsciousness and hemiplegia, the unconscious state lasting from a few hours to a day. The paralysis only partially disappeared. The limbs could be moved, although he had little use of them. The left hand was closed most of the time; with a little effort he could open it. Hand pressure was very weak compared with the right one. Upon waking he looked dazed. There was almost complete hemianæsthesia, and a constant twitching at the left angle of the mouth; also ataxic and amnesic aphasia. Memory greatly impaired.

Status Presens.—Before operation made the following notes: Is in fair flesh. Presents a "nervous look." Has partial hemiplegia of the left side. Drags the left leg while walking. Carries his left hand closed. Muscular power greatly diminished. Pressure with left hand very feeble. There is limited motion of the left arm. Can lift it to the horizontal with shoulder, slowly; left hand opens halfway slowly. There is almost complete loss of general and tactile sensation. Hemianæsthesia may be said to be almost complete. Is unable to tell which finger or toe is being pricked with a pin. Does not feel it about the face. Our interne, Dr. Boomer, stuck a pin almost through the lobe of the left ear and the patient gave no evidence of having felt it. Touch any portion of the left half of the body and extremities with bottles of hot water, he takes no notice of the heat. A snowball was placed against his left arm, leg and face without his knowledge; he remained ignorant of its presence. Can not add a column of six simple numerals. Does not know the value of the figures. Does not know when he had the last convulsion. Can not remember when his wife called to see him last, although she was here yesterday. His vocabulary is limited. Is afflicted with both amnesic and ataxic aphasia. Speaks a word hesitatingly; seems too tired to speak another; shakes his head; evidently can not think the word. Can not write a connected sentence of five words. Drops one or two words in the effort. L. E.—fundus very much congested; V. 20-60. R. E.—V. 20-20.

On presenting this patient before the class I said the localization symptoms of irritation and of partial destruction are well-marked. There are the local headache, tenderness and pain; the "signal" symptoms as first noticed by his wife, in the left middle finger, followed by clonic convulsions of successive groups of muscles; the hemianæsthesia; tremors at the left angle of the mouth; tetanic contracture of the left levator orbicularis and of the platysma muscles; also the hemiplegia of the left side pointing directly to the right side of the brain as the location of the *fons et origo* of the man's condition. Reading these symptoms in the light of modern pathological knowledge we may feel absolutely sure that there is a lesion about the cortex of the brain corresponding to the right motor area, as mapped out by Ferrier and Horsley.

The history of the case points to traumatism as the origin—causing inflammation, infection, or both, with their sequelæ. There may have resulted thickening of the bone; possibly a splinter was driven into the brain from the inner table and has led to the formation of a local abscess. There is the possibility of a blood clot alone, or as a complication of the conditions already mentioned.

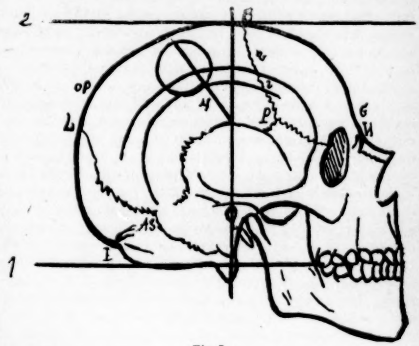


Fig. I.

1. Base line.
2. Parallel tangent line.
3. Bi-auricular.
4. Fissure of Rolando.
The circle represents trephine ring, P. Pterygon.
button within.
N. Nasion.
G. Glabella.
I. Inion.
B. Bregma.
S. Stephanion Superior.
S. " Inferior.
O. P. Occipito Parietal fissure.
L. Lambdoid suture.

The patient's head had been shaved and thoroughly scrubbed with soap and water and washed with a bichloride of mercury solution, 1 to 2000. I now took the measurements for locating the fissure of Rolando. My method is to project a base line from the crown of the teeth of the upper jaw backwards, which will cross below the mastoid process on a line with the condyles of the occipital bone. Next a vertical line was carried at right angles with the base line (see Illustration 1,) upwards through the middle of the auditory meatus to the top of the head and parallel with the base line. At a point 6 cm. above the middle of the auditory meatus made a dot with tincture of iodine;

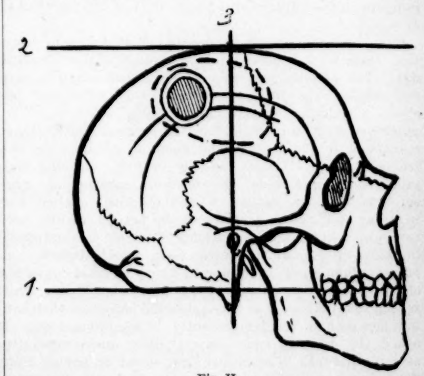


Fig. II.

1. Base line.
2. Parallel tangent line.
3. Bi-auricular line.
Circle indicates opening into skull.
Broken line of the oval indicates the area of adhesions, and bounds the space occupied by the blood clot, beneath the dura mater.

from this dot carried a line obliquely backwards and upwards at an angle of 33 degrees with the bi-auricular line

thus. Marked out, *approximately*, the course of the fissure of Rolando. Having mapped out the fissure we again washed the scalp thoroughly. Before cutting through the scalp I pierced it with a drill and marked the line for the central pivot of the trephine. To prevent hemorrhage the lock stitch devised by my friend, Dr. Frank, was used. With the stitch I cut off from the circulation an elliptical area measuring 12½ by 10 cm. (5 by 4 inches). Within the area I cut down through the scalp and periosteum, making an oval flap 6 cm. wide, and lifted it up from behind forward to the extent of 7 cm., (2 4-5 inches), leaving the base of the flap in front; thus the opening in the scalp was placed at the most dependent portion. The flap was held back with warm sterilized gauze by Dr. Cullen, our interne. I now placed the trephine upon the skull so as to cover the fissure of Rolando, but had it extend further back of the fissure than forward, so as to get nearest the point in the skull covered by the scar in the scalp. The trephine was one and one-half inches in diameter. The bone was quite dense, five-sixteenths of an inch thick. The sclerosed condition of the bone was evidently due to osteitis. The dura mater was crossed by several large veins, and bled readily on being touched. After passing the needle through the dura mater, a half teaspoonful of blood entered the syringe. Finding nothing between the dura mater and calvarium to account for the man's condition I tied the veins and cut the dura mater one-fourth of an inch from the margin of the opening, and carried the incision around three-fifths of the circumference of the ring. The membrane was very thick and cut like leather, presented a yellowish appearance. A blood clot now came into view—it was semi-liquid.

By inclining the head to the right side, we caused the clot to glide out; the quantity was about two tablespoonsful. There was considerable lymph in the arachnoid membrane all over the exposed surface. My index finger passed readily under the cranial vault and was swept about its circumference two inches forward and downward, an inch backward and half an inch inward to the longitudinal sinus. Around the entire area there were adhesions present showing that there had been at least a localized meningitis here and probably a leptomeningitis. The arachnoid could not be separated from the pia mater. Looking closely at the exposed surface the membranes were as one, thickened by lymph deposits. I tore the adhesions asunder between the arachnoid and dura mater by *very gently pressing* against them, the force of the pressure being directed towards the outer membrane. No hemorrhage worth mentioning followed this procedure in the present instance. My fingers were a little blood-stained. I explored the brain farther with the needle. It descended into the ascending frontal convolution towards Broca's speech center. Only a little brain substance entered it. Pierced the posterior portion of the ascending parietal convolution, behind the fissure of Rolando and above it. Noticed the patient's left leg jerk as the needle entered the cortex. The needle next entered directly behind (or as nearly as one could compute) the Rolandic fissure near the hand and finger centers. There was no evidence of abscess in any of these points; hardly felt justified in exploring farther in the presence of the pathological conditions already found. Washed the exposed parts with sterilized water, using very little pressure with the syringe, having first surrounded the tissues involved with sterilized gauze sponges to prevent the water from pouring into the subdural space beyond the limit of disease. There was a dark appearance of the deep membranes in spots, probably due to deep congestion of the pia mater, and the brain seemed to yield more readily to pressure here as if it was a little softer than in other parts.

As the vessels of the pia mater dip into the brain, the presence of softening of the brain would not be surprising. Leptomeningitis is said to be a cause of such a pathological condition. Had I been confident that the brain tissue had undergone degeneration it would not have seemed justifiable, in the face of what had already been done, to extirpate it. Removal of it would have produced permanent monoplegia. Not knowing what nature might accomplish by the regenerative process it seemed wise not to disturb it. I proceeded to close the wound, by first stitching the dura mater with catgut, in continuous suture, leaving a small opening at the lowest part for drain and insert a small drainage tube, having chiseled a groove in the margin of the button and taken out a few chips of the parietal bone directly opposite to prevent pressure on the tube. The button of bone was replaced. The scalp was stitched with silkworm gut, an opening being left at the lowest portion for the drainage tube. I now removed the lock stitch. Next dusted iodoform over the scalp wound, covered the head with two layers of iodoform gauze, four layers of sublimate gauze, placed a thick layer of cotton around the entire head and a Moorish bandage or cap over all.

NOTE:—Feb. 21. The patient lifts his left leg and bends the knee while walking. Before the operation he dragged the leg. The twitching at the left angle of the mouth ceased three weeks ago. General and tactile sense partially restored. Says he feels his left arm and leg, as if there was life in them; they seemed dead before. Can recognize which finger is touched with a point of a pin, without seeing it. The ear is sensitive to the touch. Headache has left him. Talks better, frequently speaks a sentence of a dozen words. Sometimes the words come smoothly and rapidly, at other times somewhat hesitatingly. Brain tires easily. An hour and a half after the operation was completed he said, "Doctor, can't you shut off that man's whistle?" referring to a patient in an adjoining room whose whistling annoyed him. The words were spoken distinctly and with little hesitation. Two weeks ago he could not open the left hand or lift the fingers. Now he opens the hand widely and extends the fingers. Has had no convulsions. Is improving daily. I omitted mentioning that our patient took iodid of potassium up to two weeks preceding the operation to make sure that no error should occur in operating. There was no indication of syphilis and the history of traumatism had not been ascertained. As already mentioned, the gentleman said nothing about the injury to the scalp until it was discovered by ocular and digital examination, and his attention was called to it.

Feb. 29. Had bone ache; bone was tender. There was evidence of necrosis. I opened the wound, removed the button, and chiseled away small bits of bone. March 31. Had a convulsion. Reopened the wound and removed a semicircle of dead bone about the cranial opening. There were adhesions behind the dura mater and arachnoid. For a time he seemed to improve again. April 6, while telling some of his friends that he felt better than he had for years, he was taken suddenly with epileptic seizures. They recurred daily. On the 11th of April I opened the wound once more, hoping to find a removable cause for the convulsions. Found adhesions to the dura mater and softened brain tissue, with two small abscesses of the size of pea. Died April 16.

Autopsy revealed extensive area of softened brain tissue, with two small abscess centers the size of a pea, and the dura mater re-attached. For at least one inch below and back of the trephine opening the bone was one-sixteenth of an inch thicker than that of the opposite side.

Case 10.—729. Wesley Hospital Record. Admitted March 20, 1893. Mr. W., aged 52 years. Has always been well and hearty. A locomotive engineer by profession. Eighteen months ago was badly hurt in collision of electric cars. Struck the side of his head against a door jamb. Six hours later, in the night, while drinking a little water fell to the floor unconscious and paralyzed. Next morning conscious-

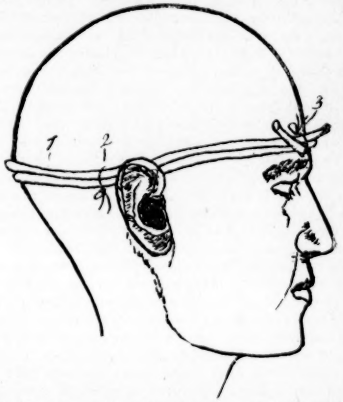
ness returned, but he remained hemiplegic. Was aphasic four months. Remained in bed nine months. Has imperfect motion and loss of muscular sense in the entire left side. General sensation greatly impaired. Is troubled with insomnia. The right parietal bone feels somewhat flattened, as if it was stove in.

Notes taken before operation:

Left hand assumes silver fork position, with excessive extension of all the fingers. Can be about one-third way closed. Can not bring the ends of fingers within five inches of the palm of the hand. Raises the left arm to an angle of about 30° with the side of the chest. Forearm in extension forms an angle of 15° with the humerus. Rises from the chair slowly, with difficulty and trembling, using his right arm as a prop on the arm of the chair. Can not stand erect; body leans forward at the pelvis so as to form an angle of 15° with the thigas. Left shoulder droops three and one-half inches. While sitting he can with the aid of the right arm carry the left leg over the right knee by making repeated efforts. Patellar reflex is exaggerated. On closing his eyes while standing his body oscillates and he fears falling. Can not walk a step without strong support, and never has done so since receiving the stroke. He moves his leg with great difficulty, leaning upon the shoulder of an attendant. Does not bend the knee, but drags the leg. Walks on the outer side of the foot. His knees jerk occasionally when he tries to walk. Left ankle is weak and turns easily. General muscular tremors noticed after standing five minutes; more noticeable on the left side. Has imperfect control of the urine; urinates three or four times at night. Micturition variable during the day time. Experiences difficulty in passing urine; may take two minutes to start it, and can not be controlled at will. Bowels move with difficulty. Tactile sense dull; can not distinguish between two points unless they are two inches apart, and then is not certain. Distinguishes heat and cold with difficulty on the entire left side of his body, face and limbs. Pin points applied to the left foot and leg cause reflex jerking, although he hardly knows what troubles him. No cremasteric or elbow reflex elicited. Left arm and leg are stiff; they bend with difficulty, especially the arm. Nearly all of the muscles are contracted, the extensors most severely. He cries easily and is very irritable.

On the 13th of April, after having the patient most thoroughly prepared, I cut through the scalp, making an oval flap as usual, so as to raise it from behind and below; lifted the periosteum with it. Found the parietal bone depressed near its center. With Roberts' trephine modified, one and one-half inch diameter, I sawed out a button. The dura mater was quickly exposed. The skull was only a trifle over one-eighth thick and quite elastic. It was not broken, but simply bent in like the side of a battered stove pipe. There was no cerebral pulse apparent. All around the border of the opening just made the bone could be seen curving in and pressing upon the dura mater. The latter at once raised up to the level of the external surface of the surrounding bone. The elevator could not bring the edges of the bone away from the dura mater sufficiently, so I deliberately enlarged the hole in all directions, perhaps one-eighth of an inch, and again pried the bone with elevator. Was now rewarded with restoration of pulsation, which the members of the class noticed distinctly at the distance of eight feet. There was no bleeding during the operation. My plan* of constricting the head with a double circle of one-third inch solid rubber cord tied with stitches to the scalp at two places worked admirably. There was, however, free hemorrhage after the constrictor was removed, largely from the bone. The wound was stitched with silkworm gut. It healed promptly. The day after operation he closed his left hand firmly, and pressed mine with force. A few days ago the gentleman left the hospital greatly improved. Our interne, Dr. Seymour, took the following notes May 27:

Can close his left hand completely and gives a strong grip with it. Can touch both ears and top of his head with the left hand. Can straighten out the left foot and extend it. While lying in bed can flex the left leg at the thigh and knee. Walked to the front door and back (100 feet) without the assistance of even a cane; getting up and sitting down alone. Sways a little when standing with eyes closed. Stands nearly erect. Can raise arm at the shoulder to right angle with the body. General and tactile sense greatly improved, but not perfect. Talks more fluently; his words are uttered with more force. Is less emotional and has better control of his temper. Has control of sphincters. Discharged greatly improved May 27. Advised massage treatment and electricity for the muscles, which I believe will in time enable him to go to work.



*My method of controlling hemorrhage in operations about the head is here shown. A firm solid rubber cord, one-fourth to one-fifth of an inch wide (1), is wrapped tight about the head twice. The cord is not tied into a knot, but the ends are crossed in front and tied together with a heavy silk thread placed around them (3). The thread sinks into the cord sufficiently to keep the ends from slipping. The cord is held in position by means of two or more suture threads. These are placed in position by means of a curved needle, which is passed through the scalp under the cord. They are then tied around the cord as in illustration (2). Two or more of these loops may be used at different points.

Discussion.

DR. MCRAE of Atlanta, Ga.—These injuries are so frequent that we all meet them, and it is our duty to operate in every case. I recently had two cases which exemplify this. One was an injury the result of a fall from a horse, which caused a triangular depression on the top of the head. I never saw such violent hemorrhage from a fracture of the skull as occurred in that case. I immediately ran my finger into the wound in the scalp, and shortly the hemorrhage ceased. I then prepared for operating, but as soon as I tried to make an opening in order to elevate the bone the hemorrhage commenced again violently. I packed with iodoform gauze, stitched up the scalp, put on an antiseptic dressing and sent the patient home. The man made an excellent and uninterrupted recovery.

Another case was that of a boy 14 years of age who was struck over the parietal eminence. I found the bone depressed, and quite a quantity of brain substance had escaped. I operated immediately and he made a good recovery.

A third case was that of a boy who fell from a horse, but as no immediate serious symptoms developed, the family did not call in a physician. He got along all right for a while, and then a persistent headache began to manifest itself, later a progressive paralysis, and now he is only able to sit up in bed. This demonstrates what the outcome is liable to be without operation.

DR. AVERILL of Pennsylvania—About four years ago I was called to see a child 3 years old who had been kicked by a horse. The superior portion of the frontal bone was fractured, with depression of the upper edge to the extent of about one-half or three-fourths of an inch, lacerating the meninges extensively as well as the brain tissue. I removed probably two or three ounces of brain substance, excised the lacerated meninges, brought together the soft tissues of the scalp, dressed antiseptically and obtained a very satisfactory recovery. There was never any febrile condition, little pain, and the recovery was complete in about five weeks.

DR. GRIFFITH of Kansas City—These reported cases are

very interesting to me. My idea is that we can not be too careful about the prognosis in these cases, and also about insisting on going into the scalp to ascertain whether or not the skull is injured; there is nothing dangerous about this procedure, and we can promise the family that no harm will result from it. I think the method mentioned for stopping hemorrhage of the scalp unique. In our place we do it by the pressure method, opening the scalp, running a loop stitch clear around a given area going down on to the skull proper, and in this way we get a complete closure of all the vessels in this area.

DR. REYBURN, Washington, D. C.—I am more inclined to operative interference in these cases than I was in the early years of my practice. I think that where there is any suspicion of a serious injury it is best to open the scalp and ascertain positively the condition existing. I will cite in support of this a couple of cases in my own experience: One case was that of a boy who had been struck over the head by an iron bar, and shortly afterward went into violent convulsions. I immediately, upon my arrival, opened the scalp and removed the depressed bone. The improvement was immediate and the case went on to recovery.

At about the same time another boy was similarly injured, but he did not come under my hands at once, nor did he receive the attention which he should have had. On the third day I removed a spicule of bone which extended into the brain; soon after symptoms of inflammation of the brain developed and death resulted. So I repeat that my advice is, where there is any doubt in the mind of the surgeon, to invariably open the scalp and clear away any such doubts. There is no danger whatever in such a proceeding except in a child of from 2 to 5 years of age, but when the individual is older than that, in waiting there is danger of the development of inflammation of the brain.

DR. SCHAEFER—In reply to Dr. Griffith's remarks about the loop stitch I will say that it was introduced by a Chicago surgeon, Dr. Frank, a few years ago. I followed this method in one of my cases and came to the conclusion that it was inferior to the plan described in this paper. It increases the danger of infection, as it is necessary to cover quite an area, and the needle will have to enter the tissues perhaps fifty times, while in the method illustrated only two or three, and occasionally four stitches, are required. I am pleased with the stand taken by Dr. Reyburn of Washington. I believe that more of these cases could be saved by timely operation. In all probability those who die after the operation would have died anyway.

A REPORT ON SOME CASES OF BRAIN SURGERY.

Read by title in the Section of Surgery, at the Forty-fourth Annual Meeting of the American Medical Association.

BY EMORY LANPHEAR, M.D., PH.D.

KANSAS CITY, MO.

Surgeon to All Saints Hospital and to the German Hospital; Consulting Surgeon to the Good Samaritan Hospital; Professor of Operative and Clinical Surgery in the Kansas City Medical College.

Only too often reports of cases are published before sufficient time has elapsed to determine whether or not a cure has been effected. While a rule which I attempt to follow is, to report no cases until I am satisfied as to the outcome, a few case histories have been published regarding which I wish now to make a supplemental report:

(*A.*) *Removal of Gasserian Ganglion.*—Something more than a year ago I sent out a report of a case of removal of the Gasserian ganglion by the method of Mr. Rose. Inasmuch as this operation is still a debatable one, its opponents claiming that the disease for which the operation is made will return inside of a few months, we who are in favor of the operation are compelled to report from time to time as to the condition of patients. The case to which reference is made has progressed satisfactorily during the past year, and has had absolutely no return of the fearful neuralgia, so I feel constrained to repeat that which I said in making my report of the operation namely, that a complete cure has been secured. While the operation is a most formidable one, there are many cases of inveterate, incurable trigeminal neuralgia which are of sufficient severity to justify the operation, and I believe it is worthy of further trial. The method of Rose is certainly the best yet devised, though possibly further experiment along the line proposed by Frank Hartley of New York,[1] may show it to be better.

(*B.*) *Cerebral Hemorrhage.*—About two years ago I published a report of my first case of trephining for cerebral hemorrhage. This was a case of subcortical bleeding, and the record of it was printed only a few months after the operation. At that time a statement was made that the results were satisfactory. The subsequent history of the case is one of restoration to health with ability to work and to care for himself, although the use of the arm was not regained nor was his speech, owing to the great destruction of the cortical substance in the arm and speech centers.

Since that time I have operated upon two other cases of cerebral hemorrhage besides a number of cases of "apoplexy" due to meningeal hemorrhage. The second case of true cerebral hemorrhage was that of I. M., 54 years of age, who came under my care in June, 1892, suffering from hemiplegia and aphasia due to a hemorrhage. He was admitted to All Saints hospital and after due preparation a large flap was turned back and three one-inch buttons removed over the arm, leg and speech centers. These I joined by bone forceps. The dura was opened; no evidence of hemorrhage was to be seen except a white infiltrate over the speech and lower part of arm centers. This was opened and a considerable amount of broken-down brain removed; extending the cut upward toward the leg area, a clot a little more than one inch in length was found about half an inch below the surface pressing upon the connecting fibers of the leg and arm regions. This was removed, the cavity irrigated, and catgut drainage established, with the usual closure of dura; the pieces of skull were replaced and the scalp carefully sutured to hold them in place; usual dressings.

Convalescence was speedy and uneventful. For three days there was a little fever (100° F.) and absolutely no improvement in paralysis; then motion began to return slowly to the affected side and in a few weeks patient was walking around with a cane with but little difficulty. Motor power has not returned in the hand, but the arm and fore-arm now have some motion, slowly improving. Speech remains wholly unaffected. The bladder irritation and obstinate constipation, so prominent before operation, have entirely disappeared, and patient regards himself as vastly improved.

The third case was that of J. P. E., male, age 42 years, patient of Dr. J. R. Kistler who saw him at 4 P. M. on March 31, 1893, and found left-sided hemiplegia which came on 32 hours before while straining at stool; for some hours previously he had complained of vertigo and had spoken of a "bad feeling" in the head with heaviness of hand and foot two days before, at which time he went to bed with some vomiting. Temperature 100½; convulsion of paralyzed side occasionally; has been wildly delirious for some hours, and is becoming comatose. He was removed to the German hospital.

[1] Annals of Surgery, May, 1893.

At 9 A. M. coma was complete; I opened scalp and removed piece of skull two by four inches over motor area. The dura very tense and pulseless. On cutting through the dura the brain bulged prominently through into the opening. With a knife I cut directly into the ventricle through the parietal convolutions and found clot filling the lateral ventricle with considerable fluid blood mixed with the cerebro-spinal fluid and broken-down tissue. I cleaned out the clots gently and irrigated with hot normal salt solution. As oozing seemed persistent a little iodoform gauze packing was introduced. Bulging was less, and after suturing dura around the packing, pulsation was found to have returned. Usual dressings and after-treatment.

April 1. Patient died at 10 A. M. Diagnosis, death from shock.

Owing to my absence from the city, no autopsy was held.

After the severer apoplectiform symptoms have disappeared, embolism must be excluded as trephining would be wholly unreasonable in the latter disease. One must also carefully distinguish from hemiplegic forms of intracranial syphilis and tumors which may be suddenly manifested.

The following points will be found useful in determining whether or not trephining is justifiable when the diagnosis of a cerebral hemorrhage is clearly established:

1. When there has been a blow upon the head and hemiplegia, aphasia, or hemianopsia follows, there is nearly always a hemorrhage which may be cured by opening the cranium at the point indicated by cerebral localization.

2. Paralysis of the third, fourth, or sixth pairs of nerves indicates a lesion in the pons and contra indicates operation.

3. A slight premonitory attack, affecting speech temporarily, or producing a heaviness of hand or foot for a few minutes, if followed by hemiplegia may be taken as a good point in favor of operation, as the bleeding vessel is probably on the surface or very superficial.

4. Paralyses of a very limited extent, especially if complete, are not often due to hemorrhage—being local palsies rather than the peripheral indicative of cerebral disease.

5. A very severe headache followed by gradually but rapidly deepening coma and hemiplegia becoming more and more complete means a hemorrhage into the great basal ganglia—probably beyond surgical help.

6. When the case presents a history of moderate loss of power or complete hemiplegia without unconsciousness, followed in a few hours by sudden appearance of coma, marked fall of temperature succeeded by some fever, a hemorrhage has broken into the ventricles or beneath the membranes, is still progressing, and indicates immediate trephining; a day or two afterwards will be too late, so if done at all it should be performed within a few hours, if possible.

7. Very sudden and complete hemiplegia and coma (coming on as if the patient were struck with a hammer) usually means embolism; heart lesions, endoarteritis and syphilis strengthen the probability.

8. Bilateral hemianopsia (blindness of corresponding sides of both eyes) appearing suddenly is apt to be due to a hemorrhage in the occipital lobe of the opposite side and justifies exploratory operation.

9. Profound coma and relaxation without any hemiplegia usually depend upon injury to the pons and decide against operation.

10. Vomiting, severe occipital headache and vertigo, with or without a distinct paralysis render a cerebellar hemorrhage probable; ocular symptoms, like nystagmus and strabismus are also apt to accompany these symptoms of cerebellar lesion; exploratory operation is justifiable.

11. According to Hughlings Jackson, convulsions, early rigidity and conjugate deviation of the eyes of a spastic form are conclusive evidence of hemorrhage. Convulsions always accompany hemorrhage in young persons.

(*C.*) *Idiocy.*—A year ago I presented the history of a little idiot from California operated upon by linear craniotomy. At that time the improvement had been quite remarkable. During the past year his progress has not been so rapid as was anticipated and yet has been quite satisfactory. The present condition, according to the report of the mother, is promising as to the future development of the child's mind, and physically he is in far better condition than before the operation.

During the last year I have made nearly a dozen craniotomies for idiocy, not only in the microcephalic variety, but also in cases of congenital idiocy, hydrocephalic, epileptic and traumatic. The most satisfactory of these cases is that of Henry B—, of Cairo, Ill., patient of Dr. J. C. Sullivan, age 9 years, presented for operation September 22, 1892. Family history neurotic, epilepsy and insanity being present in near relatives. General health excellent; no history of illness except meningitis at his third year. He has presented all the signs of the genetous form of idiocy since his birth, and has suffered from convulsive epilepsy for several years, the seizures increasing in severity and number until they occur almost daily of late. *Status presens*—Child well developed physically, except in the lower extremities; has all the symptoms of congenital agenesis of gray matter, viz: idiotic expression, prominent and brutal lips, irregular and decayed teeth, and dribbling of saliva; he has the habit of sitting alone and swaying back and forth with a crooning noise, quite frequently throwing himself back on the pillow, screaming or moaning, tossing his head from side to side as if in pain; mental condition a perfect blank. The mother states that the child has never shown the slightest sign of intelligence, has never attempted to walk or to use his hands except automatically, has never tried to say a word, or appeared to notice anything that is said to him nor to pay attention to tones; at times she even thought him deaf because of his inattention to sounds. He has to have his food masticated and put far back in his mouth, as he has never learned to chew, and sometimes can scarcely swallow food, even liquids. He lies for hours, sometimes, simply whining to himself or moaning. He becomes fretful when hungry, but is generally good-natured when kept well-fed.

The mother was told that this was a case that presented absolutely no hope from operation, as it was a variety that had never been operated upon so far as can be learned, and operation might possibly prove fatal. It was explained to her that there was the barest possibility that the irritation set up by the operation might produce a trifle of improvement, and she decided to take the chance; consequently

the child was prepared in the usual manner for operation.

September 22.—Craniotomy made at All Saints hospital, on the left side of head; skull very thick; dura bulged strongly into opening, pulseless, but in enlarging trephine hole to the usual dimensions, pulsation was established. The opening through the dura showed a paleness of the brain, and shallow sulci were noticed. Dura and scalp closed and patient put to bed in good shape.

September 23.—Little shock noted. Patient slept well. Restless this morning, but food given him, after which his actions were the same as if no operation had been made. Temperature 99½.

September 24.—Doing nicely; no disturbance from operation; has a brighter appearance; does not moan nor act as if in pain so much as before operation, and symptoms less severe.

September 31.—Convalescence from operation has been uninterrupted. The mother notes the great change in the manner of conduct, and hopes for improvement.

October 5.—Operation made on right side of head. Bone greatly thickened, but soft; removed to the extent of two by four and one-half inches. Dura not opened; no blood lost; duration of operation, 28 minutes.

October 6.—No shock; resting quietly; temperature 99; in evening, doing well; sitting up as usual.

October 7.—No bad symptoms; restless manner entirely gone; has not cried since operation.

October 17.—Discharged from hospital.

December 26.—Mother writes that Henry is improving in general condition; spasms very infrequent and not severe, and he is beginning to pay attention to what is said to him, and particularly as to the tone of the voice. When spoken to crossly he cries as would a baby six or eight months of age. He is learning to play with toys, and seems to take an interest in some things that are going on about him.

March 22, 1893.—The mother writes: "Henry seems altogether different. He has lost the restless way he had before the operation. He seems contented and satisfied everywhere. His feet are filling out, and he is getting a little use of his legs. His flesh is firmer and more solid. When he is hungry, he hollers, "Eat, eat, eat!" and, Doctor, his ways are all so much like a one-year-old baby's. He tries to climb up by chairs and stand on his feet, and I notice that if he happens to fall when climbing up, he is careful to hold his head up and try not to fall again. He does not put his hands to his ears and head as he did before the operation. He gets amused with playthings and seems to enjoy himself. He seems to grow stronger in every way, but does not improve about walking. Still, he wants to hold to anything that he can reach. He eats hearty and sleeps well. His arms and body seem to be very strong, and his lower limbs are improving also. The way I first noticed his flesh was getting more solid was when he would kiss me he would press his cheek against my face and it felt so much harder than before you ever saw him, so I felt of his arms and legs, and I know that he is gaining in flesh.

"Well, Doctor, I have been asked more questions about him since his operation; it seems to be a miracle the way he has improved, so everybody says who sees him. He blows his lips like a child just learning to talk. He can say four words right plainly, and he often does what I tell him to do and seems to understand me. I can say God bless you, and hope that some day we can send you money."

This was a typical case of congenital idiocy, and as pronounced as any that has ever come under my observation; yet if the mother's report can be regarded as true, the amount of development since operation has been more phenomenal than that of any case that has ever been reported; which leads to the conclusion that operation is justifiable in such cases in the way of further experiment.

The second case I wish to report is that of Roy L—, of Independence, Kan., age 12 years, patient of Dr. W. A. McCully. Well developed; general health, good, and in excellent bodily condition. As a baby he was excessively nervous, but otherwise well, and was fairly intelligent up to the age of three and one-half years, when he began to have "night terrors" and a few months later developed epilepsy. Since then his mental development has been very slow. November 29, examination shows patient to be suffering from epileptic idiocy (the idiocy being of high grade); his language is fairly good, though sharp and quick, and only the most infantile forms of expression are used. His right side is far less developed than his left, and the spasms are always on the right side of the body. He bolts his food, and has to be watched constantly because of a developing viciousness. He can intimate when he wants to micturate and defecate, but can not unbutton his clothes. He has absolutely no idea of right or wrong, the moral sense being totally absent. He plays with the usual toys, is passionately fond of music, and can readily learn to whistle a tune. Operation was strongly advised for the cure of epilepsy, with the advice to send the child to the Wilbur School for the Feeble-Minded at Kalamazoo, Mich., as soon as recovery from operation has occurred.

December 1.—Operation made at All Saints hospital with the usual flap on the left side; no bleeding of consequence. With a gouge a cut was made through the skull to the dura just at the margin of hair on forehead, then opened up over the frontal and motor regions about two inches wide and four inches long. Over the leg and a part of the arm center there was found an angioma measuring about one and one-half inches across. Inflammatory deposits were numerous, and after excision of the tumor the adhesions were broken up without hemorrhage, though the veins in the dura were almost varicose in size and had to be ligated with catgut. Dura sewed with catgut, iodoform put in, catgut sutures in the scalp, usual dressings. Duration of operation, one hour and ten minutes. In the evening he was resting well; temperature 99½, and no evidence of spasms.

December 2.—Slept four or five hours. No spasms during night; temperature 99 at 10 o'clock A. M. At 10 P. M. quite restless, so ordered two drams of elixir of bromid of potash, to be repeated if necessary.

December 3.—Slept nearly all night. In fine condition at 10 A. M. Temperature 98½. Sitting up in bed playing.

December 5.—Patient allowed to get up last evening. During the night had a few slight convulsions; otherwise doing first rate.

December 9.—Dressings removed. Wound found healed by primary union; general condition satisfactory.

December 21.—Patient discharged from hospital. No return of spasms. Crossness and viciousness very much improved.

May 10, 1893.—Reports from patient indicate marked improvement in his mental condition. Language is being acquired with great rapidity. Education already begun with gratifying success. No return of convulsions since discharge from the hospital.

This was a typical case of idiocy due to convulsive seizures, I believe, and may be taken as an illustrative case of what can be accomplished by operative procedures in cases of suitable character. Of course no man can make a diagnosis of angioma of the dura before operation, so that in a measure such cases are exploratory. Although too little time has elapsed since the operation to speak definitely as to the ultimate result, it seems to me that the amount of good already accomplished more than compensates for the outlay of time and money.

(*D.*) *Cerebral Softening.*—It was my good pleasure to report the first case of trephining that was ever made for softening of the brain. By the term "softening" I do not mean cerebral abscess; all surgeons would trephine for that disease; nor to the condition formerly called "red softening," which is in reality only the initial stage of a suppurative inflammation, which, if not arrested, leads to destruction of the nerve cells by pyogenic microörganisms—but to the condition which follows cerebral hemorrhage or embolism, in which, upon opening the skull, we find a softened mass semi-fluid in consistence, of purulent appearance, but in reality not pus. The case mentioned was one of cerebral hemorrhage involving the speech center and the motor area of many months' standing. The diagnosis was clear and unmistakable—the maddening sensations in the head and the temporary fits of irritability in which attempts had been made upon the life of his wife were undoubtedly due to a condition of true softening. The head was opened under the strictest antiseptic precautions, and a cavity containing nearly a pint of broken-down brain and other *debris* (but no pus) was carefully irrigated. This cavity was filled with normal salt solution, the dura replaced and stitched, the scalp sewed into place without drainage, with a firm compress of gauze. His recovery was uneventful as already recorded elsewhere; nor was the improvement merely temporary as was predicted by some who heard for the first time my proposition to relieve such cases by operation. To this day he has had no recurrence of the bad symptoms. He is enjoying life in traveling, and has sent me a number of other cases for trephining. He feels that his improvement has been decidedly great, and he is going about, spreading the good news that for such hitherto helpless cases there is a possibility of relief in surgical interference.

Thyroid Feeding in Myxedema.—Recent observations show that feeding of the thyroid gland is quite as efficient in the treatment of myxedematous conditions as the hypodermatic injection of the thyroid extract, while it is much less troublesome and is free from the grave risks attendant upon the injections.

Alexander (*Medical Chronicle*, No. 3, p. 175) reports the entire disappearance of a myxedema lasting two years in an insane woman. The mental condition was not improved. Half of a thyroid gland of a cow was employed, given twice weekly, finely divided and mixed with bread crumbs.

INTESTINAL ANASTOMOSIS—BY A NEW METHOD, WITHOUT PLATES AND WITH BUT TWO KNOTS—EITHER SILK OR CATGUT SUTURES MAY BE USED.

Read before the Section of Surgery and Anatomy at the Forty-fourth Annual Meeting of the American Medical Association.

BY M. E. CONNELL, M. D.

SUPERINTENDENT OF MILWAUKEE COUNTY HOSPITAL.

When through injury or disease it is found necessary to exclude or remove a portion of the intestinal canal, the question of restoration of its continuity which comes to the surgeon, and how or which is the best method to accomplish this desired result is one of great importance.

Many methods are now in the surgical field; but we cannot have one too many if all are good, and the surgeon must familiarize himself with one method or be equally proficient in all, in case of an emergency, such as gunshot wounds or strangulated hernia.

The universal interest which has been manifested in the plate operation and its modifications, indicate very clearly that any method which promises an improvement in the technique of intestinal surgery, whether in suturing or the saving of time, will be gladly welcomed by the profession.

It is now more than a year ago that I made a union, which seemed to me to promise a great deal; a method which I thought could be applied to the intestinal canal at almost any point, and wherein the number of knots would be reduced to two. I do not wish to be understood as claiming that a reduction in the number of knots would in itself be any improvement; while of course it would be a factor very acceptable to the surgeon if time could be saved in this manner, and there would be a coalescence of the other points in the technique, thus forming a desirable combination with the number of knots.

It is obvious in the method I will endeavor to describe to you, and I think you will agree with me, that more than two knots would be detrimental; one tie at each end of the incision or union is all that can be used advantageously, for the one great desideratum connected with this method is that every part of the suture be buried out of sight, as in the plate operation, and where the number of knots is increased to three, four, six or more, I do not see how this very important point could be achieved, for you will notice that if this suture is made properly, knots at any point other than the end could not be securely buried.

The idea herein involved is probably a modification of the plate operation, that is, the same in principle but without plates.

I felt certain that if I could penetrate or transfix both bowel walls when the serous serfaces were in apposition, and after being transfixed could keep them so, that is, with the serous surfaces in constant contact I would accomplish by means of this suture what had been gained by the plate union.

With this object in view I tried a series of experiments on dogs. I placed the serous surfaces of the walls to be sutured in apposition, and secured them so by a continuous to and fro or serpentine suture. I then drew these two walls apart, loosening the suture, so to speak, and turning the intestine over

brought the serous surfaces of the other two walls together, and transfixed them with a similar suture.

The results have indeed been remarkable. This idea I have modified so as to apply it to all parts of the intestine, to the stomach and gall bladder as well.

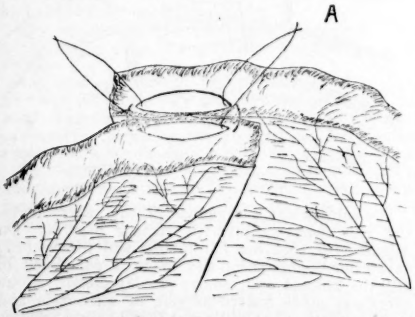
It would only consume your valuable time to detail the many attempts and failures which led up to this method of suturing, which I do not doubt will recommend itself to you as eminently fitting for the work that I claim it will do.

My first application of this suture was in oblique enterorrhaphy; the intestine being divided obliquely *a la* Robert Morris of New York; but my effort at this session will be to briefly describe to you this method of suturing as applied in anastomosis, wherein the initial steps are the same as in the plate operation.

The bowel is severed or a portion resected; the cut ends of which are then invaginated and closed with catgut or silk sutures.

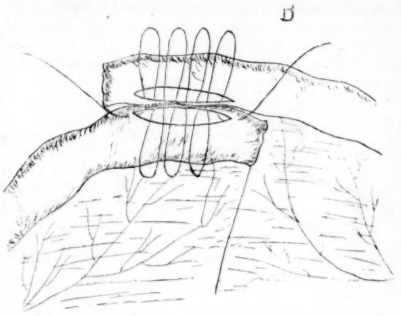
The closed ends are passed by each other, and an opening (I prefer one slightly diamond, or oval shaped), of any length desired is then made in the convex border of both the proxinal and distal portion of intestine.

The opposing walls are then placed side by side, so that the ends of incision are parallel with each other, and I found that it facilitates the work to have a suspending thread or loop run through the bowel at each end of the opening, and held by an assistant. To insert this thread for suspension, you pass your needle from within outwards through the walls of one portion of bowel, and over to the other, passing the needle from without inwards, then bring both ends up through the openings and tie, thus having the knots above. (See A.)

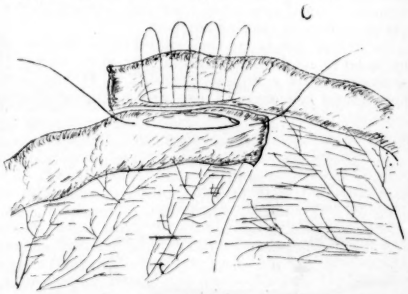


When there is a tendency to great eversion of the margins of the openings, or when you have made an unusually long incision, it will further greatly assist you to have a third suspending thread inserted midway between the other two.

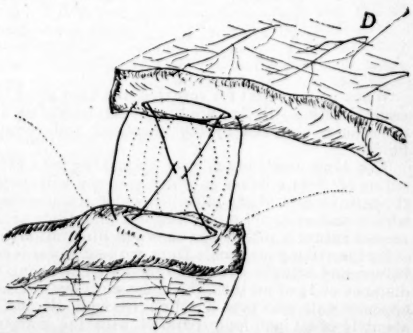
As your assistant applies gentle tension or traction to these suspending loops, the opposing serous surfaces are brought into perfect contact, and you can very quickly insert the first suture, which is of looped stitches, by inserting your needle from without inwards through the bowel wall, at the right end of one opening, then passing it back and forth through all coats of both walls which are in apposition until the full length of incision has been secured, and pass your needle from within outward through the bowel wall at the opposite end of opening, leaving



each stitch as a loop on the side where taken, (as in B) or each alternate stitch may be loose, thus having your loops all one side, (as shown in C).



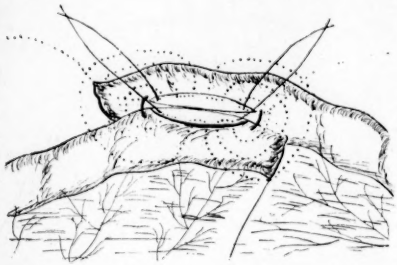
You next withdraw the middle suspending loop, if you have inserted one, and then separate these sutured walls as far as the looped stitches will allow; pass the knotted ends of suspending loops down



through the middle, (D) draw them up on the other side, and you will have the serous surfaces of the other two opposing walls in opposition. (See E.)

You can now put in a middle suspending thread if you wish, and then insert your second suture, in the same manner as the first, with the exception that no loops are made, all stitches being drawn tight.

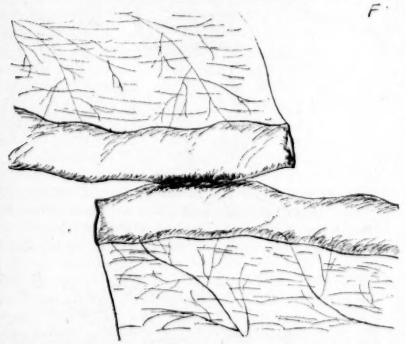
E



You now withdraw all suspending threads and draw up the loops of your first suture, and pull the opposing ends of both sutures till taut, and tie; not cutting off the ends of sutures after making the first knot until you have made the second, as they are necessary in making traction.

After both knots are tied, cut off the ends close, so as to leave no dangling drains, and your union by anastomosis is complete. (See F.) It has never been found necessary to use any retaining sutures.

F



When using catgut for suturing, the knot must be secured with a silk ligature to prevent loosening, as it becomes softened by the intestinal and serous fluids.

This same result is achieved by making your first suture of tight stitches, in which case you will avoid the turning over of the intestine, which seems somewhat puzzling to not a few surgeons and then your second suture is inserted as shown in illustration G.

By inserting your needle from without inwards as before, and bring it out on the same side at about a distance of 1¼ of an inch, then passing it over to the opposite wall and take a stitch through *all* coats about 1¼ of an inch long, parallel with the margin of wound, and repeat until all has been secured and pass your needle out as before, when your sutures are drawn taut and tied and you have same result as at F.

In the series of experiments to which I have referred, many specimens were preserved, and from them I have selected these, which you will see are illustrative of the results obtained from the application of this suture in anastomosis.

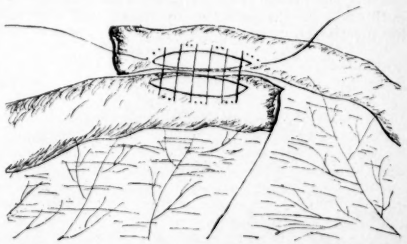
I have made no attempt to dissect or remove any of the stitches or suturing material, and as I am aware that time is a great factor in proving the value of a method, in some cases I have allowed quite a lengthened period to elapse between the experiment and the resection or death of the animal, the shortest time having been five days and the longest seven months and eight days; there is one still living of eight months duration.

In oblique enterorrhaphy the shortest time was fourteen days and the longest five months and twelve days; there is one still living of eleven months duration.

In circular union where I employed but one knot, the shortest time elapsing between experiment and resection, was twelve days, and there are three living, two of about eight and a half months duration and one where three circular unions were made at one time, which are now of six months and eighteen days duration.

The date of the experiment and time of resection or death of the animal is tagged with each specimen.

Although it may seem a little foreign to the subject of anastomosis, still I wish to mention and show you the specimen of No. 10 which operation was made on July 14th, 1892, when a union in two places at one sitting was made; both of these unions were of the oblique method and about one foot apart.



The subject was a large mastiff, the suture material very heavy catgut with darning needles. On August 29th, 1892, one (1) month and fifteen (15) days after the operation was made, I concluded to kill the animal and remove the specimen, so no effort was made toward asepsis or antisepsis and before resecting I also thought that I would practice on the intestine. An oblique enterorrhaphy was made between the two unions before mentioned. Then I resected that portion of intestine embracing these three unions and reunited the divided intestine by anastomosis, using the looped and tight stitch suture. Three suspending loops were used with perfect ease.

This anastomotic union was also made only for practice, but it looked so perfect that I concluded to close the abdomen and give the animal a chance to live, thus making experiment No. 17.

The first to which I wish to call your attention is that of experiment No. 12. It was on intestinal

anastomosis, the experimental operation being made August 1st, 1892, in the presence of Dr. J. H. McBride of the Milwaukee Sanitarium, the subject being a small pug dog.

This was the first anastomosis made by this suture, my thought in previous work having been in the direction of an end to end union by the oblique incision *a la* "Morris."

In this instance the first suture was of tight stitches, and the second was loose or parallel, though not looped stitches.

The dog was killed August 16th, fifteen (15) days after the operation. There were no adhesions, the abdominal cavity being free from all signs of any inflammation, the internal organs lying free and in normal position. The intestinal union is perfect; there seems to be no cicatricial contraction worthy of mention.

I would next like to have you observe the specimen of No. 13.

In this case there was a double operation made on August 3rd, 1892. An anastomosis similar to that of No. 12, which we have just examined, and an oblique union.

This subject was a very large savage bulldog which was given to me as a sacrifice to science on account of his being so very troublesome. He escaped from our kennel fifteen days after the operation and when we went to his former home for him, his master would not give him up, stating that the operation had changed his disposition to that extent, that the family were willing to give him a new trial.

The dog's good behavior continued for several months, when he slid back into his old habits, and he was again turned over to us and was killed March 21st, 1893, seven (7) months and eighteen (18) days after the operation.

Silk sutures were used in both the anastomosis and the oblique enterorrhaphy.

The specimens will speak for themselves. No adhesions, or signs of any inflammatory action were found.

The next specimen of interest is that of No. 14, which in all probability can be considered under the head of anastomosis, it being that of a gastro-enterostomy, the union of the stomach at the convex surface with the duodenum at about its middle third.

The operation was made on August 10th, 1892, and the animal killed September 22nd, 1892, twelve days after the operation. Here also there was found no adhesions of abdominal contents. FF silk suture was used in making this union which seems perfect in every respect. (The communicating foramen being quite large.)

One month and eighteen days after the second operation was made, the animal was killed and we have here a very interesting specimen. It is extremely valuable in showing how nature will come to the surgeon's rescue, if given half a chance.

Here we have an anastomosis with what would be deemed an extraordinary length of incision, namely one and one-half inch, and following even this unusually long incision we still find the formation of an enterolith, with which as it increases in size from accumulations we find the incision or anastomotic opening and the bowel enlarging from day to day, so that in one month and eighteen days after the anastomosis was made we have the proximal end of the intestine distended to a distance of about ten (10) inches from the point of operation. Yes, distended we might say to four times its normal size and the distal portion of the bowel is also enormously dilated.

This portion of intestine in its distended state, produced by the obstruction from the enterolith, resembles in point of capacity that of an ordinary dog's stomach. It may be of interest to note here that at the time of making the anastomosis, instead of placing the ends of divided bowel so that the peristaltic action would be downward, they were so placed that both closed ends were parallel, thus directing the peristaltic wave of the distal portion upward, which no doubt favored the formation of the enterolith considering the mixed diet which a dog selects.

The specimen of No. 18 is that of an intestinal anastomosis made in the presence of a "doubting Thomas," Dr. Mackie, after his return from his last visit to Europe. The operation was made September 6th, 1892, and the animal killed one month later, on October 6th, 1892. No adhesions were found and union is perfect.

In No. 21 the subject was a large white dog. On September 28th, 1892 a double anastomosis was made in the presence of Dr. Mackie of Milwaukee and Dr. Philler of Waukesha. The animal was killed October 6th, 1892, eight days after the operation; and at the site of the first union an immense enterolith was found. This specimen is of interest in showing, that while both unions were made at the same time, the concretion of bone had formed at the site of the proximal union only, while reparative adhesion takes place at both unions, the distal one being perfect; no enterolith or distention whatever.

In the next and last specimen to which I wish to call your attention, there is also the results of two experimental operations on the same subject, which was a small brown dog. An oblique enterorraphy, No. 25 was made October 31st, 1892, and two weeks later on November 14th, 1892, a cholecysto-enterorraphy, No. 26 was made, the gall bladder being united to the duodenum. Four months later on March 13th, 1893, this animal was killed and the specimens removed as you here see them; they have been examined frequently and the unions have stood the test of thorough manipulation. This I deem a very interesting specimen and I hope you will all examine it carefully. It is probably the first time in the annals of surgery that union of the gall bladder with any part of the intestine has been made, experimentally or otherwise, wherein but two knots were applied in the suture.

In conclusion, I wish to ask your consideration for the advantages which this suture offers in comparison with others:

As to the question of speed, the only operation with which this method can be compared is that of the anastomotic union by means of plates, rings or buttons; the plate method as first devised by me had six knots to tie, which was modified by Prof. Senn, he reducing the number to four; even then, in the hands of a skillful surgeon, I think this suture would compare favorably as to time.

Another point in favor of this suture, and a valuable one, is its applicability or adaptability to any part of the intestinal canal, and in whatever form you choose; you are not limited to an anastomosis, for you can make a terminal, circular or oblique

enterorraphy with as great rapidity. In its use you are not confined to intestinal unions alone, for you can unite the gall-bladder or stomach with the intestine at any point.

You are not restricted as to the length of the incision, and this being the case the suture is very applicable in pylorectomy, whereby you can remove any length of the pyloric end of the stomach, and unite it with the duodenum by making an incision in its convex surface of the desired length; or the pyloric end of the stomach and duodenum may be cut obliquely, and union then made by this suture.

An additional great advantage which this suture has above all others, is that no foreign substance is used. While the dog will not object to bone, rawhide or brass, the human subject might, and the surgeon has always in his pocket case the material to make a union such as I have described.

And last but not least, the result obtained in these experiments forced upon me the conclusion that Czerny and Lembert's teaching that but two coats of the intestine should be included in any one suture is so far as dogs are concerned not absolutely necessary, for you will observe that I have in every case penetrated the mesenteric coat, gone into the lumen of the bowel, brought the needle out again, *from* the lumen of the bowel through *all* coats of the intestine, thereby exposing the part penetrated by the needle point to infection, by the drawing of the suture material through the bowel walls. I am satisfied that this result could not have been obtained, were it not that the point through which the thread passes is buried in the tissues and surrounded by contact of serous surfaces.

That this suture is practical, and that the results are equally as satisfactory as any union heretofore advanced, has been fully shown by the specimens submitted for your examination.

DR. OVIATT, Wisconsin—The ideal suture is one which does away with a foreign body of any kind and we have this in Dr. Connell's stitch. Another advantage it offers is that we always have the materials at hand—catgut and a darning needle will answer the purpose. I have used Connell's stitch twenty-five times on dogs with two deaths, both of which were due to accidental causes. I think the next serious criticism to be offered the use of plates and the button is the inability to get an opening of sufficient size. I have done Connell's operation in less than ten minutes.

DR. HERRICK, Ohio—I wish to mention an interesting case of my own. A woman 48 years of age had evident symptoms of closure of the cystic duct. I performed an operation upon the gall bladder by bringing it up to the incision in the abdominal wall and holding it firmly against the abdominal walls to prevent the passage of bile into the abdominal cavity. I removed sixteen stones and washed the bladder out with warm water. I then found another accumulation in the cystic duct and removed them, closed the opening into the duct and closed together the openings in the bladder and in the abdominal wall. I secured immediate complete union and the patient was fully recovered in two weeks.

DR. MURPHY—I wish to thank the gentlemen for the interest they have taken in my subject. I wish to say a few words in regard to the foreign body element. The suture has been used an enormous length of time in all ways. I have not yet tried Connell's suture but am favorably impressed with it. It has been found that in the vast experience of the past the use of the suture method has resulted in a mortality of 47 per cent., while with foreign bodies the death rate is 24 per cent. I don't care what it is, the approximation that will give that kind of a result is what we want.

E. W. ANDREWS, Chicago—I should like to ask Dr. Connell if this lateral anastomosis is preferred by him to the end to end anastomosis.

DR. CONNELL—In reply to Dr. Andrews I will say that I don't think this is the best, but it is the easiest to make. The other is nearest the ideal when the corners are satisfactorily turned in and the knot buried.

THE MURPHY BUTTON.

Dr. J. B. Murphy of Chicago, made a demonstration on a dog, of the method of making intestinal anastomosis by the use of the "button" bearing his name, after which he made a brief explanation of his method.

DR. H. O. WALKER, Michigan—I wish to speak particularly of Dr. Murphy's button, having used it three times on the human subject. The first case was a case of cholecystoenterostomy. The conditions at the time of the operation were very unfavorable, and the patient died the following morning. It required fifteen minutes to perform the operation. My next case was that of a woman 38 years old who was brought to me on the 26th of last December. She was suffering from a fecal fistula in the right iliac region and was greatly emaciated. Her suffering was so intense that morphine had to be used liberally. Three attempts had been previously made to close the fistula. I made the incision, found the adhesions and completed the operation in seven minutes. The button was never seen again, probably on account of the negligence of the nurse, but the woman made a good recovery. The next one was a bad case of strangulated hernia which had gone unrecognized seven days when it was brought to me, and at that time general peritonitis existed. I did the operation this time in six minutes, and in operations on the dog have done it in four minutes. One element in particular claimed for the button by Dr. Murphy should be well considered, that is the short duration of time required when it is used.

DR. RUTH, Iowa—I have for some time been considerably interested in intestinal work, and when Dr. Murphy's button first came out, I thought simply that it was another appliance to be tried, but upon second consideration of its claims I fell in love with the thing. I performed my first experiment on the 10th of last January and have done many since then, and in no case has there ever developed a fistula, and in no case did the dog die as an immediate result. One point about the button which I wish to especially recommend, is the fact that no foreign substance is left permanently in the abdominal cavity. To the question, will the button pass out, I can say that it will. But even if we have to make a secondary laparotomy occasionally to recover a retained button, it nevertheless has sufficient recommendations.

REPORT OF A CASE OF SUCCESSFUL END-TO-END SUTURING OF INTESTINE.

Read in the Section of Surgery and Anatomy, at the Forty fourth Annual Meeting of the American Medical Association.

BY ERNEST T. TAPPEY, M.D.
DETROIT, MICH.

There is a decided division of opinion among surgeons on the subject of the methods employed in uniting different portions of intestine. Some are eager to try, if not to adopt, each new device in the way of plate, ring or button, as it makes its appearance; and others either cling to the older method of

suturing or go back to it after having had a trial of the newer methods. The latest device as far as I am aware, is the Murphy button. This, like all others of the class, labors under the disadvantage of remaining for some days as a foreign body of considerable size in the intestine, and at the same time possesses the undoubted advantage of rendering the operation of union much shorter than the older method of suturing.

Abbé has found that the older plates and rings that necessitate only a slit in the side of the intestine in the performance of an anastomosis, are defective in their later results. The opening contracts one-half to two-thirds and as the original opening is one inch and a half, it gradually becomes only three-quarters of an inch or half an inch. Abbé therefore has given up using his catgut rings and other contrivances of this kind, and depends upon the suture entirely, making the opening four inches long. This he considers a very important feature of the operation. (*Med. Record*, April 2, 1892.)

It is to add to the literature of the subject of suturing that I report the following case: Here the wound was one of the small intestine and I preferred to depend upon the suture rather than upon the Murphy button, though I was tempted to use the latter and was dissuaded only by the thought of the button in the intestinal canal after the operation should have been completed.

Alex. McDonald, a man about 40 years of age, remained in Port Huron, Mich., on his way home and while there March 19, 1893, a left inguinal hernia became strangulated. He was allowed to remain in this condition five days. Then a surgeon cut down to liberate the gut, but found a knuckle gangrenous. The wound was not closed but the intestine was sewed to the skin and the patient was then sent to Harper Hospital in Detroit, where he came under my care. I found the whole sac black and gangrenous, and gangrenous tissue about the opening in the intestine, the contents of the bowel discharging through the wound entirely and none through the anus. The sac was amputated at once. I then waited a week until all necrosed tissue had sloughed away and healthy granulations covered the wound surfaces. April 4, chloroform was administered and I proceeded to repair the intestine, with the kind assistance of Drs. McGraw and Walker. The adhesions were broken up, about two inches of the gut excised, a V-shaped piece of the mesentery removed and the cut surfaces then brought together with silk sutures—first the mesentery then the mucous membrane and finally the peritoneal coat of the intestine; here two rows of continuous Lembert sutures were applied. The external wound was left open and packed with iodoform gauze. The patient took chloroform very badly; the action of the heart was so weak that chloroform was withheld and nitroglycerin was administered hypodermatically. The latter part of the operation was performed while the patient was conscious. There was comparatively little sensation, the patient lying still and not complaining while the sutures were being placed in the peritoneal coat. This was of considerable interest to me, for I had seen a short time before, a discussion in the London *Lancet* as to the sensitiveness of the peritoneum, Lawson Tait and others maintaining that it is extremely sensitive, and still others maintaining exactly the contrary.

The recovery was not interrupted by any complications. There was no leakage of the bowel, no rise of temperature above 100. Ten days after the repair of the bowel I curetted the external granulating wound, pared the edges of the skin and sutured them together. This was done without an anæsthetic. There was union by primary intention except one-half inch at the lower angle. Patient was kept on fluid food for three weeks. He left the hospital at the end of five weeks.

DISCUSSION.

DR. MURPHY of Chicago.—I have used the suture repeatedly and it has many advantages, but it has the disadvantage as to time required and as to leaving stitch holes behind inviting infection and if suppuration results from any method that method is not a success. The element of contraction always pertains to lateral approximations and in a lesser degree always to circular ones. If it is wished to make a lateral approximation, anywhere that this can be done an end to end approximation may be done, and where it can be made end to end the button can be used. The foreign body element has been brought up repeatedly in the consideration of the button and this is the very least thing that concerns it; if this is the strongest opposition it is to meet we welcome it because we feel positive that that objection amounts to nothing. I could conceive of a pathological condition which would prevent the free passage of the button but I hope that none of us will get the button into an intestine which is diseased from end to end. The element of time is an exceedingly important one and with the button an approximation can be made in the very shortest possible time. Recently in an operation for removal of a dermoid cyst, I began the incision at 11:34 o'clock, the cyst was removed at 11:39, it took until 11:43 to locate the intestinal obstruction and at 11:48½ the resection and placing of the button was complete; the external wound was closed at 11:58, the whole operation having lasted nineteen minutes.

DR. JELKS of Arkansas.—I should like to ask Dr. Murphy if the use of the button is applicable to gunshot wounds of the abdomen.

DR. MURPHY.—It is a peculiar fact that in bullet wounds of the abdomen the perforations of the intestines are as a rule in close proximity so that ordinarily you can take out a single section one to three feet in length and the ends then buttoned together. It is known that a section of intestine three feet long can be taken from a dog and that animal survive, and it is believed that the same could be done with the human subject. It has already been demonstrated by Dr. Andrews that fifteen inches can be removed.

DR. GASTON of Georgia.—This is an appropriate occasion to bring to the attention of the members of this Section an operation done in 1859 where I had occasion to reunite an intestine from which thirty inches had been removed in the case of a man who had attempted to commit suicide. We removed three pieces of gut each over ten inches long. This was when Simm's silver wire suture was first coming into use and we effected with wire as nearly an absolute end to end union as possible. Seven interrupted sutures were put into the circumference of the gut. We found that the ends adjusted themselves to each other accurately by the contraction of the circular fibers of the intestine. The man was kept under the influence of opium after the operation, five grains being given every three hours for forty-eight hours. The final result was favorable and in less than a month the man was up and going about his business. I had the dejecta watched for several weeks but no signs of the sutures were found. Some years after the man died

from other causes and on *post-mortem* we found that the sutures had entirely disappeared, and there were no signs present of any operation having been done on the intestines.

DR. VERITY of Chicago.—This button of Dr. Murphy's is a good thing and its application a good one. If it should get dammed up in a constriction of the intestine another button can be put in to help it out.

DR. TAPPEY of Michigan.—I feel that the Murphy button is of wonderful utility and I will be glad to use it in some cases. I would like to ask Dr. Murphy if he will say anything on the subject of the sensitiveness of the peritoneum.

DR. MURPHY.—I could say nothing from my own experience as I have never operated on the peritoneum when an anæsthetic was not used.

DR. BOUFFLER of Chicago.—The element which Dr. Tappey has brought out is the keynote to the situation—that is the element of time. I have made a few resections and even where you can get the intestine out it takes time. I don't believe a double row of stitches can be done properly in less than twenty minutes. In two cases it took me twenty minutes; one died because he was wounded a few hours previous and I lost time, and also lost the effect of handling the intestines as little as possible. Persistent handling of the peritoneum lessens its vitality and greatly increases the danger of infection. In consideration of that item, we should have some means of doing the operation in less than twenty minutes.

Another point—surgeons operating in this locality frequently forget their anatomy and fail to recall the manner of the attachment of the mesentery, therefore manipulating the intestines from one end to another. This would be entirely unnecessary if they would remember the obliquity of the attachment of the mesentery to the posterior abdominal wall. Every point that shortens the time of the manipulating of the intestines increases the recoveries. The Murphy button does this. I should not be very much afraid of its causing an obstruction, but would feel very comfortable that it had saved to the patient a fifteen minutes' manipulation of his intestines.

THREE CASES OF ACUTE INTESTINAL OBSTRUCTION TREATED BY ABDOMINAL SECTION.

1. Intussusseption—2. Volvulus of Sigmoid—3. Strangulation by Meckel's Diverticulum.

BY A. J. OCHSNER, B. S., F. R. M. S.
CHICAGO, ILL.

In reporting these cases of acute intestinal obstruction, due to mechanical causes, I am aware that so small a number of cases cannot have any definite influence upon the plans of treatment which have been discussed with so much vigor in the medical societies in all parts of the world, especially since the general introduction of antiseptic surgery has made surgical treatment, theoretically at least, very attractive.

The fact that individualization is of especial importance in cases of intestinal obstruction makes each additional observation of some value.

I need not detain you by discussing the general subject of intestinal obstruction. This has been done so thoroughly by men of great experience in almost every civilized country, and especially well by our own Professor Senn, that I can certainly not improve upon it. I will consequently at once proceed to consider the cases which I have treated:

Case 1.—December 15, 1892, I was called to see Edwin N., a bright, healthy child, 3 years of age, at 741 N. Clark St. His physician, Dr. O. N. Huff, gave me the following history: A week ago the child fell a distance of a foot or two, and complained of a little pain in the region of the cæcum for a few moments, but almost immediately resumed his play. From that time he repeatedly had small twinges of pain in the same region but not severe enough to cause any anxiety on the part of his parents. Within the last six hours he began to suffer severely from pains in the abdomen and to complain of nausea.

The pain was very severe and spasmodic, and during the attacks the abdominal walls were tense and a hard sausage-like mass could be felt and seen to the right of and a little below the umbilicus. A rectal examination gave a negative result. The child had a constant inclination to evacuate the bowels, but the attempts remained fruitless, exeept there was a small amount of mucus passed once or twice.

Dr. Huff and Dr. R. G. Bogue, who had already examined the case, made the diagnosis of intussusseption, which I readily confirmed. I immediately proceeded to perform an abdominal section. After the patient was anæsthetized, the abdomen was washed and shaved, then washed again with soap and water and with strong alcohol. An incision four inches long was made in the median line below the umbilicus. The transverse colon was brought out of the wound and was found to contain an invagination of six to eight inches each of the ascending colon and the ileum. There were no adhesions and the serous surfaces were not inflamed; nevertheless it required a considerable amount of force applied alternately by pressure from below and by traction from above to reduce the intussusseption. The vermiform appendix, which was five inches in length and almost without any mesentery, had formed a loop around the ileum at its point of entrance into the cæcum. I ligated the appendix at its origin, disinfected the stump with strong carbolic acid, inverted it into the lumen of the cæcum and covered it with a fold of the peritoneum from either side, by means of a few fine silk stitches threaded in ordinary cambric needles. The peritoneal cavity was then closed with silk stitches grasping all the layers of tissue of the abdominal wall.

A sufficient amount of morphia was administered during the first four days to control pain and to lessen peristalsis; on the fifth day a small glycerin and warm water enema was given which effected a slight evacuation of the bowels. A daily evacuation was obtained in the same manner after this for the first two weeks. The stitches were removed on the ninth day. The wound healed primarily throughout. Rubber adhesive straps were used to support the abdominal scar for six weeks after the operation.

There was scarcely any deviation from normal in pulse and temperature after the operation, and the child showed almost no shock. He was permitted to sit up three weeks after the operation and to walk about a week later. His diet consisted of milk and broth for four weeks, and of very simple and easily digested food for two months more.

The child is in perfect health at the present time, six months after the operation.

In this case it is probable that at the time of the original fall the vermiform appendix was thrown around the ileum, causing a slight constriction, and that this in turn gave rise to the intussusseption; consequently the removal of the appendix would be likely to prevent a recurrence. This peculiarity in this case seems to me to be of especial interest.

It was deemed wiser not to attempt to reduce the intussusseption by means of large enemata, because

we could not be certain as to the condition of the intestine nor the anatomical cause, which evidently must have been connected with the fall. Moreover, the intestine has been ruptured upon applying as low as five feet of hydrostatic pressure[1] and it seemed apparent to all who examined the case that it would require much more force to reduce the intussusseption with the conditions present; for the same reason insufflation with air was omitted. The conditions we found upon opening the abdomen fully confirmed our previous conclusions.

Case 2.—Isaac Libin, a German laborer 32 years of age, who had formerly always enjoyed good health, came under my care January 29, 1893, giving the following history: Five days before, while walking in the dark, he stumbled and fell into a ditch two or three feet deep. He experienced a slight amount of pain in the left inguinal region but paid no attention to it. Two days later he began to suffer throughout the abdomen, the pain becoming very severe about twelve hours before I saw him. The patient's abdomen had become tympanitic and he had suffered from nausea. There had been no evacuation of the bowels for five days and no passage of gas. The patient had the appearance of a strong healthy man suffering from a very severe acute disease, giving him an anxious look.

There was a globular enlargement in the lower part of the abdomen, a little to the left of the median line. The patient suffered severe colicky pains and requested that something be done at once. Cathartics and enemata had been administered for two days with great persistence but without effect.

My diagnosis in this case was volvulus, probably of the sigmoid. Two hours, and one hour, previous to my seeing the patient, my assistant had given him hypodermic injections of morphia, one-fourth of a grain each time to control the pain.

The skin covering the abdomen was at once cleansed, disinfected and shaved.

An incision was made in the median line, at first three inches long and enlarged to twelve inches after the preliminary examination. A volvulus of the sigmoid flexure was easily discovered. The intestines above this volvulus, both large and small, were considerably distended, but the portion of the colon composing the volvulus which was apparently two feet in length, was enormously distended having the appearance of an inflated stomach, its diameter being nearly twelve inches. It was impossible to reduce this volvulus within the abdominal cavity; it was therefore permitted to protrude through the incision, when it was reduced by making a half turn. It was again impossible to return the largely dilated intestine into the abdominal cavity; consequently an assistant carefully dilated the sphincter-ani muscles and introduced a large soft rubber tube, similar to a stomach tube, into the rectum and up into the dilated colon. This permitted the gas to escape, which at once reduced the size of the intestine sufficiently to allow its replacement in the abdominal cavity. The intestines had in the meantime been protected by the use of towels wrung out of warm sterilized water.

The abdominal wound was closed with silk sutures grasping all the layers of tissue of the abdominal walls. The rubber tube was left in place in order to secure the continued escape of gas. The operation was completed in fifty minutes.

No food was administered for forty-eight hours; at the end of this time the patient was given small quantities of milk and lime water every two hours. The temperature rose to 101,4 F. during the first twenty-four hours after the operation. The pulse never exceeded 116 beats per minute. After the second day the temperature remained normal, and the pulse varied from sixty to ninety beats per minute. After the fifth day the bowels moved daily under the use of enemata. The patient was limited to liquid diet and was advised to be careful about his food for several months after leaving the hospital. The wound healed primarily and the patient was discharged from the hospital in an excellent condition March 1, 1893, just thirty days after the operation.

This case illustrates the principle laid down several years ago [2] by von Wahl, and explained experimentally by his assistant,[3] that the presence of an abdominal dilatation and fixation, of an intestine, perceptible by inspection or palpation, indicates the presence of strangulation. It is plain that relief can be obtained only by means of an operation in patients suffering from a strangulated intestine. It is claimed that in very rare cases the patient has been relieved by the formation of adhesions followed by ulceration, causing an anastomosis; but this seems so unlikely to occur that the surgeon can not hope for such an issue in any given case. In this case peritonitis had not occurred from the introduction of microörganisms [4] into the peritoneal cavity through the walls of the intestine; a serious condition which would undoubtedly have followed had the operation been postponed for several hours.

The advantage derived from stretching the sphincter-ani muscle and the introduction of the rubber tube into the enormously distended colon in this case should not be under-estimated. It not only enabled me to replace the intestine with greater ease and less strain upon the patient, but it prevented the further accumulation of gas in the colon after the operation.

The contractile power of the circular muscles of the colon had been much lessened by the over distention; notwithstanding this, gas passed freely through and along the sides of the rubber tube which was left in place for four days, being moved slightly several times a day to prevent harm from pressure.

When emptied of gas and replaced, it did not seem necessary to fix the sigmoid to prevent a recurrence, because the intestine maintained its position without any support. In this case this could not have been improved by forming folds of meso-colon parallel with the gut [5] as this would have caused a bunch-like arrangement which in turn might have interfered with the fecal circulation. Suturing the meso-colon to the parietal peritoneum [6] or stitching the colon itself in the same way with a few sutures [7] was contra indicated by the condition of the intestine resulting from the enormous dilatation. It seemed to me that the least possible amount of disturbance of the intestine or its mesentery would be of especial importance in preserving the organ.

No further attempts at irrigation or insufflation were made before proceeding to operate, because this method appears to be of very doubtful value, except very early in the treatment of volvulus, for the reason that one cannot determine the power of resistance of the diseased intestinal wall.[8]

Notwithstanding the fact that it has been demonstrated upon the cadaver long ago [9] that volvulus can be reduced by insufflation of air, the conditions are so different that experiments on the cadaver are of very little value.

The use of massage [10] seems too dangerous and too

little promising to be considered under the condition in which I found the patient. Moreover, large enemata had been employed patiently and persistently before the patient came under my care.

Case 3.—In the night of Febuary 27th, 1893, a neighboring physician requested me to see Mr. Daniel B. of 326 Mohawk St., in consultation with him. The patient was 81 years old; had always been well and was at the time in fair general condition, with the exception of showing symptoms of acute shock.

Four days previously he had suddenly experienced a severe abdominal pain at a point a little above and to the right of the umbilicus. The severity and the location of the pain suggested biliary colic to the attending physician. An anodyne was prescribed and the pain disappeared. The patient remained quiet and suffered but slightly during the following two days, but on the next day the pain became more severe, and during the day of my visit had increased in violence notwithstanding the use of morphia. The patient had been nauseated all day, and had vomited repeatedly for six hours. During the past two hours he had vomited sturceraceous matter.

I found the abdomen distended uniformly, and there was no point of dullness upon percussion. The patient was perfectly rational; his temperature was 99° F., his pulse, 120 beats a minute.

The diagnosis of intestinal obstruction in the region of the small intestine was made, but there was nothing in the history or the conditions present to suggest an anatomical diagnosis.

Preparation for laparatomy were made at once because the shock had increased very markedly during the last two hours. The patient did not take ether or chloroform kindly; his pulse increased and his breathing was very irregular; the abdominal muscles did not relax at any time during the operation. An incision six inches in length was made in the median line, extending downwards from a little above the umbilicus. A reddish fluid similar to that contained in a hernial sac of an old strangulation, escaped upon opening the peritoneal cavity. The intestines were severely distended, and several loops showed marked congestion and roughness of the peritoneal covering.

Introducing the hand into the peritoneal cavity I at once found a hard mass in the left iliac region. Opening the wound over this point by means of blunt retractors, I found a loop of small intestine about one foot in length, which had slipped through beneath a Meckel's diverticulum, originating from a fold of the ileum, and being attached by its apex composed of a fibrous band, to the mesentery. The adhesions were very firm, and had evidently existed for years. It was impossible to reduce the intestine which had become strangulated, consequently I ligated the adhesions double with strong fine silk, and cut between the two ligatures.

On account of the patient's age and his depressed condition I did not deem it wise to prolong the operation by removing the diverticulum. The loop of intestine did not appear sufficiently injured to demand a resection; I therefore completed the operation by sponging out the abdominal cavity and closing it in the usual way.

The operation was completed at one o'clock in the morning, having occupied forty minutes. The patient died thirteen hours after the operation without recovering from the shock, although he was rational to the end. He had several evacuations of the bowels through the day, but the vomiting continued. This might possibly have been avoided, had the patient's stomach been emptied and irrigated through a stomach tube previous to the operation. This should never be neglected if the patient has vomited freely; and particularly if there has been vomiting of sturceraceous matter.

It is likely that the loop of intestine slipped through the opening on the first day, but that it did not become strangulated until about twenty-four hours before the operation, the cause being an increase in the œdema of the band and the intestine. In a younger patient the prognosis would have been very much better.

It is questionable whether an earlier diagnosis might not have been possible. It was, of course, obstructed by the fact that the pain was referred to the region of the gall bladder at first, and the cessation of pain after the use of morphia. The absolute obstruction to the passage of feces and of gas might have sufficed in completing the diagnosis. It is possible that careful auscultation[11] might have determined the seat of obstruction.

There was no congenital deformity[12] in any other part of the patient's body, which occasionally makes it possible to form a probable diagnosis of obstruction due to a Meckel's diverticulum. Besides the classical signs and symptoms of acute intestinal obstruction viz: (complete constipation; vomiting, first the contents of the stomach, then bile, then intestinal contents; if the obstruction was high, or if peritonitis had occurred; periodical pains; localized tympanitis early, general tympanitis later; violent peristalsis above the seat of obstruction); I noticed in each of these cases an absolute abhorrence of any form of food, and a constant desire for water.

The important points regarding this subject, seem to lie in securing as accurate a history as possible regarding previous sickness and especially previous attacks of a similar character; also the habitual condition of the patient's bowels. The history of an injury or of an over exertion is important. The apertures at which herniæ occur should be carefully examined and also a rectal examination should be made. The abdomen must be inspected for the recognition of violent peristalsis, which may determine the point of obstruction because peristalsis is entirely above that point. Irregularities in contour should be observed. The abdomen should be palpated in order to determine the presence of any point of resistance. Auscultation should be practiced patiently because there is no peristaltic murmur at the point of obstruction.

The abdomen should be percussed because a metallic sound can sometimes be elicited from a point above the obstruction, and a tympanitic sound over the strangulated intestine.

If a loop of intestine is strangulated, the patient has the general appearance so familiar to us in strangulated hernia. If the abdominal walls are tense, infection of the peritoneum has already occurred.

As soon as the diagnosis has been made these patients should be operated upon, first having tried carefully the use of injections, insufflation and massage to a safe extent, and that only at an early stage of the disease. Strangulation is sure to follow, which will permit the transmission of microörganisms into the peritoneal cavity. The intestine will become paralyzed by over distention and some portions may become gangrenous.

It is well to operate during the first twenty-four hours[13] after the occurrence of an acute intestinal obstruction.

DR. HENRY O. MARCY, Boston—I wish to put emphasis on the matter of washing out the stomach prior to operation. I have lost two patients on account of the severe vomiting; there is a constant pouring out of liquids embarrassing respiration; it is astonishing how much fluid is poured out of the stomach, and I am glad the writer gave prominence to this practice of preliminary washing out.

DR. DAVIS, of Birmingham Ala.—Washing out of the stomach is perhaps too much emphasized. If it is done there is again filling in a short time, and we find that not as much relief has been afforded as we had expected. I regard obstruction of the bowels as not so frequent an occurrence as we have been led to believe by the teachings of the older authors. I believe many of them are cases of peritonitis, although I have no intention of questioning the diagnosis reported by the authors. It is my experience in operating on many so called cases of obstruction that the majority of them are cases of peritonitis due to appendicitis. Obstructions from mechanical causes are, I think, rare.

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THE RELATIVE MERITS OF THE PRESENT METHODS OF TREATING PYELO-NEPHRITIS.

Read before the Section on Surgery and Anatomy at the Forty-fourth Annual Meeting of the American Medical Association.

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The old application of "surgical kidney" to the affection I have taken as the theme of this paper is certainly one which in the light of its former fatality could not have been better chosen by the critics of surgical efficiency to proclaim their jest satirical upon a disease whose only termination was death.

It was a veritable *lucus a non lucendo*. Surgical kidney, as the title took its origin, came to be so designated from its frequent genesis from dirty sounds and careless irrigation of the bladder, and from this standpoint was certainly an opprobrium of surgery in another sense. Coming from strictly pathological causes within the economy, it could not always be attributed to faults of the surgeon, and it is the treatment of these lesions to which the surgery of the present day only should perforce be directed. No modern surgeon, deserving the name, should ever endanger the life of any patient by an approach to the dirty practices *in the dawn of surgery*. With the pathology of the affection I shall deal but briefly, asking you to remember that suppurative nephritis at times occurs without preceding implication of the ureter or pelvis of the kidney.

If, however, this is the case, it is easily understood how, unless careful attention be paid to the general symptomatology, the real nature of the disease may be overlooked, since the urine passed through the catheter from the pelvis of the kidney is acid and without odor of decomposition. The multiform nature of the causes of this affection puts it in the list of diseases especially interesting to the general practitioner, and makes it necessary for him to hold constantly in mind the *surgical* nature of the affection, as treated by modern surgical methods. Many a fatal case of this disease is so only by neglect of this fact.

Incision and drainage of the kidney in the early stages of suppurative disease are not more dangerous than incision and drainage anywhere else in the economy, and it is only delay that makes the operation more extensive, and therefore, more dangerous, both on account of the suppurative process *per se*, and on account of the constantly increasing danger of the final total loss of the entire organ.

The disease is to be differentiated from simple disease of the bladder, from acute Bright's, pyemia and the like. It will be necessary for the surgeon and physician to hold in mind the affections where this condition may obtain coincidently, and the differentiation then is made generally by exclusion, though it not rarely happens that the disease is found under conditions that render its presence very obscure. The microscopic examination of the urine is never to be neglected, and the conditions of this taken together with the history and general symptomatology, is likely to be sufficient to establish the diagnosis.

Aspiration of the kidney is not to be lightly considered. It is something on the order of aspiration in appendicitis. The field is great and the question of exactly reaching a point that will decide the matter, *is one of doubt*. At any rate, if puncture is made and any other *fluid than blood escape*, incision is at once to be insisted upon, for the reason that any escape of an irritating nature, either into the peritoneum or perineal structures, is fraught with danger.

The anatomical dangers apart from those indicated, are puncture of the intestine, which is generally in front and adherent to the tumor, and puncture of important blood vessels if the trocar is too long. The liver may also be wounded, and puncture near the ribs is to be avoided in order not to wound the pleura.

When the diagnosis of pus in the kidney is established, operation is as much indicated for abscess here, as for its opening elsewhere. It is to be urged in every case by every surgeon having the light of the present understanding of the nature of the disease, and comprehending the results of surgical interference. The nature of the operation selected should be that which will best insure the ultimate safety of the patient with the least risk. In a large pus sac where the whole kidney is involved, the condition of affairs is extreme, and the operation that will give present relief is the one generally to be chosen. Cases will get well with incision and drainage, that cannot possibly stand the shock of prolonged surgical operation. But another class of cases will present themselves—those in which the suppurative process has advanced to a less degree. Here the question of choice will in the minds of many be an open one.

Let us see what are the operations suggested: Complete extirpation, and simple nephrotomy, with drainage. Where complete extirpation is to be considered, the condition of the patient is never to be lost sight of. If the kidney can in any way be preserved, no matter if only a small portion of its whole is intact, it is by all means to be urged that this be done. This is especially to be remembered

in the occasional presence of a horse shoe kidney, whose removal will most surely be followed by death from uremia. Primary extirpation of the kidney is never a simple matter. In the first place the adhesions are vast, often dense and multiform, and the patient is in little condition to stand the shock of operation.

Now, if the sac be evacuated and drained, there is a distinct gain to the patient in several ways. First, the pus is gotten rid of, and second, there is a shrinkage of the tumerous mass, with a retraction of the adhesions. Again, constitutionally, there is prompt improvement, and secondary operation if necessary is better stood. The operation by reason of the prolonged anæsthesia is dangerous to the remaining kidney, and hence the salvage of the remaining organ should not be unnecessarily risked when nothing is gained and much is to be lost, subjectively and objectively.

In the surgery of the kidney as in that of every other organ, the greatest simplicity should be sought. Simple nephrotomy in the presence of stone in the kidney, is not to be feared under ordinary circumstances, and so any other interference in which the adjacent structures are not involved is evidently of less risk than operations in which both ligation and eventration is required.

Surgical shock, of itself of the greatest importance here, owing to the generally bad condition of the patient, is enhanced by shock from hemorrhage, usually very great in large tumors of the kidney. In the weakened circulation and loss of power of resistance, heart clot from embolus is more apt to occur if the extreme operation is insisted upon in the weakened state of the patient. Heart clot it is to be remembered, is one of the urgent dangers in the removal of the kidney, and its complete ablation in greatly exhausted conditions is to be deprecated. Ideal surgery is not here logical, unless it be conceded that that surgery only is ideal which preserves life, as *I have so often insisted*.

The general logic then of the operation, as I have here endeavored to state it, is a constant effort to simplify every condition necessary both for success and the patient's safety. Primary drainage and packing, with subsequent removal if necessary, seems best to fulfill these indications. In order more vividly to impress the force of this argument let us look at the statistics of the mortality in kidney operations. Of seventy-two cases thirty-two recovered. The chief causes of death were collapse, five; peritonitis, four; peritonitis, complicated, three; exhaustion, three; hemorrhage, two; anuria, three; carbolic acid poisoning, one.—2d ed. *Times*, 1883.

Of 100 cases of nephrectomy collected by Prof. R. P. Harris, the causes of death were as follows:

Peritonitis, eight; septic peritonitis, four; pyemia, two; septicemia, one; hemorrhage, three; secondary hemorrhage, one; uremia, six; pulmonary embolus, two; shock, seven; collapse, four; exhaustion, two; excessive vomiting, two; not stated, three.

Analyzing the causes of death we find that the factors of shock, hemorrhage, embolus, collapse, and vomiting enter largely into the mortality. These, it will be seen are all consequences of total ablation in the presence of serious general and constitutional trouble. If now we add to these the cases of peritonitis amounting in all to nineteen cases in 172, we have by this factor alone a showing of nearly an increase of 11 per cent. over what might be expected, aside from other causes in cases in which the peritoneum is not interfered with. The cases of hemorrhage amount to eight, being a mortality of about 5 per cent. again from causes avoidable in the extraperitoneal operation. The same logic is applicable to the cases of shock and exhaustion, which alone amount to sixteen, nearly 10 per cent. of all the mortality.

I have not cited cases in the body of the paper, reserving these for illustration and discussion.

WEST AFRICAN NATIVE FOODS.

BY ROBERT HAMILL NASSAN, M.D., D.D.
GABOON, AFRICA.

The vegetable foods of the natives of western equatorial Africa are various, but their principal carbohydrates, their two staves of life, so to speak, are the tuber of the cassava or manioc, (*Jatiopha manihot*) and the fruit of the plantain (*Musa sapientum*).

They grow also maize, yams, sweet potato, arum, gourds, squash, pumpkin, okra, beans, tomato, ground-nuts, eschalots, cayenne pepper.

Their agriculture in that part of Africa requires no general upturning of the soil. A spot having been selected in the forest adjacent to the village, the women first go through with long knives or matchets, and cut down all the underbrush and saplings. Then the men follow, felling the trees. These with their branches and dense foliage interlocked by a super-abundance of vines and lianos, impenetrably cover the acres of the chosen space and lie dying for some two weeks. This is done during that season that is without rain; so that, when on a chosen day, the dying mass is fired the billow of flame from twigs and smaller branches sweeping over the fallen trees, burns up all except the tree trunks and larger branches. The wood-ash is recognized as an aid to fertility, though its action is not at all understood.

Women then, with a small tool somewhat like a small trowel, hollow out holes at distances irregularly, of some six feet apart, about ten inches in depth and eight in diameter, and drop into each cavity a variety of the above mentioned plants and seeds, so that there shall be *succession* in growth. (This planting is made just before the rainy season begins.)

In that succession there is the plantain sprout. Its growth is slow. It will produce in from twelve to eighteen months; while young it needs the shade. This is afforded by the manioc shrub cutting which will produce in from four, six to eight months. But the manioc also needs shade at first. This is promptly provided by the maize and other broad-leaved vegetables, like the pumpkin, which grow rapidly and give to the ground, denuded of forest, the shade necessary to prevent its fertility being "burned out" by the sun's direct rays. The maize and other vegetables give the villagers something to live on during the interval of six months before the manioc is ripe; or, of six months more until the plantains have produced their fruit. These smaller vegetables having been eaten off, the garden finally contains little else than plantains and the second growth of cassava.

The manioc is the poisonous variety. As the

woman, in gathering pulls up the shrub and plucks off the tubers, she immediately thrusts into the loosened earth a cutting of the stalk for another growth. The basket containing the tubers is set in a stream of water for three days that their poisonous quality may be washed out. On the third day the basket is carried to the village, the thick rind of the tubers is peeled off, and they thrown into a large wooden mortar. They smell quite offensively sour, having partly fermented. They are beaten with a wooden pestle into a white homogeneous dough-like mass, consisting of the starch grains, and the broken woody parts of the root. This dough is fashioned into rolls some sixteen inches long and two inches in diameter, which are then carefully tied up in plantain leaves. A large iron or brass kettle is set over a fire, a small quantity of water in the kettle, and the rolls are then arranged closely in it and covered over tightly with a package of plantain leaves to prevent the escape of steam. The effect of the steam permeating all parts of the rolls is to burst the starch grains. The manioc is now ready to be eaten. It is of the consistency of cheese; smells very sour; is practically the same as a thick, dark, coarse mass of tapioca pudding mixed with finely broken pieces of woody fiber. It is eaten by the natives with salt, native cayenne pepper ("chillies"), and a gravy of oily nuts. It will keep good for a week in a dry place; or on the drying-rack over their fires for a much longer time, becoming too hard to be cut. When spoiled by mold, it can be made again fit for use by re-boiling.

When these same rolls are sliced and roasted in ashes they taste somewhat like bread, and can be eaten as such with butter; or they can be fried in any oil, as toast. The soaked tubers, when first peeled of their rinds, instead of being cooked at all may be placed in the sun to dry, and then are preserved for many days over the drying shelves, and are then boiled for use as occasion may require, without beating them into dough. Or the tubers, without being first placed in running water, having been peeled, may be boiled, sliced into "chips" (called *ngwese*), soaked for one night in water and eaten without further cooking with salt and pepper. Another method is to have the tuber, just as it is taken from the earth, without any other preparation than peeling, grated, the pulp washed and dried in the sun, making a coarse "farina," which is used for convenience on journeys. This meal needs no other preparation than to have scalding hot water poured over it, and it then swells into a thick pudding-like mass. These several ways of preparing the manioc tuber make an agreeable variety for taste and convenience.

The plantain stalk produces but one bunch of fruit. There is therefore no need to carefully cut off the hanging bunch, which contains from twenty to forty "fingers." (A banana bunch—the *musa paradisaica*—has from 50 to 200.) The mother-stalk is then cut down. But around its base are springing up several shoots, like "suckers" of corn, varying from one foot to four feet in height. The tallest of these "children" immediately takes its mother's place, and in six months will bear its one bunch, to in turn have its place taken by the next larger of the suckers. This process goes on indefinitely, and if proper care were taken of the garden no new plantation would need to be cut; the same garden would last forever. The fruit of the plantain is rarely allowed by natives to ripen. It is cut unripe, and is boiled. It contains much starch, though less than the manioc, but is more healthful than the latter. It may also be eaten roasted.

If allowed to become over-ripe, the plantain is rarely eaten by natives. But by foreigners it is liked, being sliced and fried.

With these two articles of food to depend on, and varied by modes of preparation, the natives obtain a still more comfortable variety by boiling or roasting maize ears, eating the grains from the cob, boiling or roasting tubers of the yam and of the calladium (*Arum esculentum*), our so-called "elephant" ear, called by the natives "koko," and "eddo," the common vegetable of the South Sea islands.

Almost the only two modes of our native cookery are boiling and roasting in ashes.

Greens of various leaves are used, especially the leaves of manioc and the unexpanded leaf of the calladium; care, however, being taken to pour off the first water in which this arum is boiled, as, like our Indian turnip, it is acridly poisonous; as also is the case with the tuber of the eddo (*calladium*). A rich pudding is made from the kernel of the seeds of a gourd. The hard rind of the ripened gourd itself is also used, being carved into cups and bowls and spoons. The kernels of the seeds, free from the shells, are beaten into a paste. This paste, seasoned with red pepper and laid in strata with slices of dried fish, is broiled in a bag of plantain leaves. It is quite oleaginous; foreigners can digest but little of it, though its taste is agreeable.

The palm nut (*Elocis guiniensis*) yields a rich, oily pulp that yields the palm oil of commerce, enormous quantities being exported for the making of soap and lubricating oil. The pulp is eaten by all the natives. When prepared in a cleanly manner it is relished by most foreigners, eaten with rice and an abundance of currie or of "chillies" (cayenne pepper), a fowl or some other meat, fresh or dried, being stewed with it. It is quite fattening, the natives promptly becoming plump under its use. The fresh nuts are also eaten, roasted in hot ashes.

A hard cake made from the oily kernels of a fruit called *odika* (the wild mango) is universally used by the natives for making a rich gravy. I like it but most foreigners do not.

In their meat diet the natives are variable. They are capable of eating a very great deal of meat, but are satisfied with even a little. But that little *must* be had, or they often will refuse to eat a meal of only vegetables. For inhabitants of a warm country, their longing for meat is remarkable. Their language has synonyms for our words for "famine" and "hunger;" it has also a third word, meaning *meat hunger*.

They have domestic animals—fowls, sheep and goats, dogs and a few cats. The sheep have no wool; only short straight hair. All these animals are kept for only special occasions—feasts, payment of fines, marriage dowrys, sacrifices to evil spirits in times of great danger (when only the blood is offered, the flesh being eaten by the village). For daily meat, the hunt is depended on. But when the hunt has been successively fruitless, a cat or dog must be utilized to supply the "meat hunger." There is therefore no over-production of these domestic animals.

Elephants, hippopotami, wild oxen, wild pigs, antelopes, gazelles, gorillas, chimpanzees, monkeys, crocodiles, alligators, etc., are all hunted. All these wild animals are eaten by the interior tribes, and with them not a pound of even the skin being thrown away. Literally, *every* part of the animal is eaten, except hoofs, horns and bones. But the coast tribes hesitate and do not care to eat the rat, snake, gorilla, chimpanzee and mandril.

The natives in their untaught state never fry meat. It is boiled or broiled. A third and very appetizing way is as follows: While a wood fire is being reduced to a bed of hot coals, there are prepared several thicknesses of large pieces of plantain leaf. Into these, curved as a bowl, is poured a cup of water. The meat, cut into small lumps, is laid in successive strata with salt, red pepper and crushed oily nuts or preferably, *odika*. The edges of the leaves are then gathered up and tied together tightly as a bundle. This bundle is set on the coals. There is no flame. Before the several layers of thick fleshy leaves can be charred through, the water is partly turned into steam, which permeates the whole mass of flesh, cooking each fiber without burning or scorching, and carrying to the center of each piece of meat the aroma of the seasoning. With the juices of the meat, the residuum of the water and the oil of the melted nut is produced a most tasty sauce. I have nowhere, even in civilization, eaten any preparation of meat that is so clean, so rapid and so attractive to a hungry traveler as this native way of steaming meat. It is used for any meat; but I have found it especially suited to coarser varieties, and is a most agreeable way of preparing fish.

PNEUMONIC FEVER—ITS SYMPTOMATOLOGY.

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Cough is present in almost every case of pneumonic fever,[1] usually beginning with the very inception of the disease and continuing, with more or less frequency and severity, until the inflammatory exudate has been completely removed from the lungs.

This symptom was present in all of seventy cases analyzed by Chomel[2]; in all of Dietl's[2a] 750 cases; in 90 per cent. of Grisolle's[3] cases and in 95.8 per cent. of my series of cases.

It occasionally precedes other symptoms by a few hours, or even several days.[4] In such instances there is usually a premonitory bronchial catarrh. In a few cases the cough may be so slight and insignificant as to escape the notice of the patient and his attendants unless their attention has been particularly directed to it. In rare instances it may be quite absent throughout the attack.[5]

A Swede, aged 49, had a chill, followed by fever and sweating, every third day for three weeks. For a week he had been "feeling bad all over," with anorexia, sleeplessness and a somewhat severe constant pain in the right side and under the sternum. On May 17, 1886, he had a chill, followed by high fever, rapid and irregular pulse, great thirst, pain under the sternum, cephalalgia, mental dullness—answering questions hesitatingly and often irrelevantly, some dullness over the right lung, crepitant râles diffused throughout this lung, dyspnœa, but no cough or expectoration. He died suddenly at 7 P. M., May 20, and at the autopsy the right pleural cavity was found obliterated and the upper and middle lobes of the right lung hepatized. The lower lobe was emphysematous, congested and œdematous.[6]

Cough was absent in twenty-one of my cases, as shown in the accompanying table.

Cough is less constantly a symptom in the aged,[7] cachectic and insane than in healthy adults. In such patients a previously existing bronchitic cough may become diminished or entirely suppressed upon the advent of pneumonic fever. This is also true of the paroxysmal cough of pertussis, which is replaced by that characteristic of pneumonic fever, to again resume its original character when the pneumonic inflammation shall have undergone resolution.[8]

A female child, aged 3 years, in the second week of an attack of whooping cough, took to vomiting, had a profuse diarrhœa, became stupid and comatose, and greatly prostrated. The pulse was accelerated, the breathing hurried and the temperature considerably elevated. Sighing was a prominent symptom. When examined on the sixth day there was dullness on percussion and bronchial respiration at the base of both lungs. The symptoms continued for nine days when they became abruptly ameliorated. During this period there was no cough, although it had been very severe, and resumed its former characteristics after the subsidence of the pulmonary symptoms. Complete recovery ensued.

Cough may be delayed in its appearance, in the presence of definite physical signs and pronounced symptoms, for several days—as many as twelve in a case reported by Ray.[9]

With the profound prostration not infrequently attending this malady the cough often diminishes in frequency and power, or ceases altogether. Such cases very seldom recover.[10]

The character of the cough varies somewhat with the age, condition and temperament of the patient and in different epidemics,[11] but, contrary to the opinion held by some[12] it is usually peculiar and quite distinctive of the malady in question. At the beginning of the attack it is dry, frequent, short, restrained and painful. In some cases it is so frequent as to accompany almost every expiration, especially if the inspirations are at all deep. The length of the cough varies with the depth of the inspiration, but the impression produced upon the listener is that it is short and hacking.[13] In children it is often slight and insignificant during the incremental stage of the disease,[14] although many are made very restless and irritable by the constantly recurring and teasing cough.[15] After a few hours the cough becomes moist and is usually accompanied by expectoration. It is however, still short, restrained and painful. Later when the disease is at its height it is less frequent, more open, less painful and the patient does not so persistently attempt its restraint. It can not, however, be, as yet, called "free," inasmuch as the inflamed lung is not susceptible of being fully inflated, and sufficient air is not expelled from behind the immovable obstruction to cause a forcible explosion. If the cough is very painful and accompanied by only a scanty expectoration it is apt to be more frequent, less paroxysmal, drier, more restrained, shorter, less severe and in a higher key than when there is a free bronchial flux and but little pain.[16]

In the latter stages of the attack the cough is, usually, very powerful, paroxysmal and distressing. In children it may even cause vomiting,[17] and sometimes resemble whooping cough.[18] The severity of the cough,

however, is no measure of the gravity of the case, for there are many dangerous cases with but little cough, and *vice versa*. A severe or paroxysmal cough, coming on at the end of the exudative stage is, although an element of danger,[19] of good import, whilst the same kind of a cough during the height of the fever is of evil augury.

The cough has been known to be so powerful as to cause separation of the sternal epiphyses from the ribs in children[20] and fracture of the ribs and sternum in older persons.[21] Heister,[21a] who was probably a little credulous, tells us of a clergyman's wife who coughed her perineum open.[21b]

One of my patients, a fragile little girl of 5 years, who had already suffered three fractures of the long bones—the clavicle when a year old, the fibula at three years and the femur six months later—developed a very powerful cough during convalescence from a very severe attack of pneumonic fever, locally affecting the entire left lung. After this had continued for four days my attention was called to a prominence of the sixth rib on the right side in the axillary line. There was evidently a partial fracture of the rib at this point. The bulging was not easily reducible and remained permanent.

In rare cases emphysema of the cellular tissue or mediastinum $x^{22}a$ may follow a severe fit of coughing.[22] A soft, crepitating swelling forms on either side of the neck, extends gradually under the skin and becomes general. This accident is most frequent in childhood, adds considerably to the danger, and in case recovery ensues two or three weeks' time is required for the reabsorption of the diffused air.

A male child, three years of age, was taken with the ordinary symptoms of pneumonic fever, June 1, 1889. The malady pursued a comparatively mild course, and convalescence was declared on the fifth day. The cough, which had all the time been very severe, now became exceptionally severe and explosive. On the eighth day an emphysematous swelling appeared in the right side (the one affected) of the neck, which spread over this side of the chest. It disappeared in a week, and the child fully recovered.

Champneys[23] has experimentally investigated this subject and found that when the lung is over-distended air first makes its way beneath the pulmonary pleura, stripping it up, and passes along to the root of the lung, to the mediastinum and along the cervical fascia to the subcutaneous cellular tissue in the neck. $x^{23}a$.

Rupture of the lung, with pneumothorax, is a possible result in non-destructive local pneumonic processes, although my experience or reading has never included such a case.[24] The breaking down of softened lung tissue so as to form an abscess is a contingency by no means remote.[25] Other effects may follow violent coughing, e.g., sub-conjunctival hemorrhage, detachment of the retina,[26] hernia or the strangulation of an existing one,[27] rupture of the diaphragm, aneurism or the rupture of an existing one, etc.; but such accidents are exceedingly rare.

A merchant, aged 69, was taken, Oct. 10, 1877, with a chill, followed by cough, fever, pain in the right side, rusty expectoration, etc. There was dullness over the lower half of the right lung, and in this region the respiratory sounds were feeble, but distinctly tubular in character. They were rendered louder by forced inspiration and expiration. His cough was very violent and came on in sudden explosions, in one of which he suddenly expired on the sixth day and at a time when there were no alarming symptoms whatever. An autopsy was not allowed, but there can be but little doubt that the sudden death was due to cerebral apoplexy, caused by the violent cough.

The cough is never hollow or cavernous, as in phthisis, unless cavities are actually present. A cough of ordinary characteristics, which becomes loose and rattling, and afterwards cavernous, is almost pathognomonic of abscess.[28]

The characteristics of the cough in this disease had, with the older clinicians, a semiotic value which the discovery and cultivation of the modern methods of physical diagnosis has, unfortunately I believe, sadly depreciated. Nevertheless the clinical importance of this symptom is very great, and its features are deserving of the most careful consideration.

Cough is a modified respiratory act in which a deep inspiration is followed by a forcible expiration, with, for a time, closure of the glottis, so that any substance, solid or liquid, may be expelled from the glottis by the rapid rush of air upon the sudden opening of the glottis toward the latter end of the act. It is caused by irritation of branches of the vagus distributed to the nose,[29] pharynx, larynx, trachea, bronchi,[30] pleura, œsophagus[31] stomach, diaphragm,[32] liver,[33] spleen,[34] ear,[35] etc. In pneumonic fever the cough is due to the irritation from the inflammatory products effused upon the surfaces of the pleura and the respiratory tract.[36] It is aggravated by irritation of the neighboring organs[37] and movements of the lungs, and is allayed by rest.

TABLE I.—SHOWING CASES OF PNEUMONIC FEVER WITH ABSENCE OF COUGH.

Number.	Age.	Sex.	Previous Condition.	Character of Attack.	Range. Pulse.	Resp.	Temp.	Seat.	Duration.	Result.	Remarks.
1	46	M.	Good	Latent	80-110	20-26	99-101°	L. base	9	R.	
2	1½	"	"	Masked	120-160	36-48	102-105°	Duplex	5	D.	Red hepatization. Meninges congested.
3	21	"	Dissipated	Typhoid	120-146	26-46	101-105.7°	R. base	17	R.	
4	46	"	Typhoid fever	Latent	100-132	26-32	101-103.5°	L. base	15	R.	
5	84	F.	Senility	"	80-90	18-22	98-100°	L. entire	3	D.	Lung disorganized.
6	64	M.	"	"	60-92	24-30	101-103°	R. base	22	D.	
7	13	F.	Good	Acute	100-120	30-32	102-104.5°	L. apex	6	R.	Coughed twice during convalescence. Menstruating for first time.
8	81	"	Senility	Latent	80-110	22-26	101-103°	R. apex	7	R.	
9	82	"	"	"	100-112	24-26	99-100.5°	Duplex	5	R.	Same patient as case 8.
10	21	M.	Good	Acute	100-140	25-40	102-105°	R. entire	10	D.	
11	51	"	Insane	Latent	120-160	30-52	100-104°	L. base	4	D.	Mania. Pericarditis.
12	27	"	Good	Mild	60-92	16-22	99-101°	"	7	R.	
13	3	F.	Pertussis	Latent	100-140	36-48	102-105°	Duplex	9	R.	Cough of pertussis ceased suddenly with advent of pneumonic inflammation, to return on ninth day. Diarrhœa. Coma.
14	69	M.	Senility	"	80-108	18-24	103-105.5°	"	4	D.	
15	77	"	"	Low	100-116	20-28	100-101°	L. base	7	R.	
16	4	F.	Diphtheria	Mild	100-130	28-36	99-101°	Duplex	5	R.	Following tracheotomy.
17	57	"	Cachectic	Latent	120-160	30-40	101-104°	R. base	2	D.	Cancer of uterus.
18	69	M.	Senility	"	. . .	. . .	. . .	Duplex	. .	D.	Sudden death.
19	97	"	"	"	70-92	30-36	102-102.5°	R. base	10	R.	
20	32	"	Idiocy	"	100-120	20-34	100-103.5°	L. base	7	R.	Following an epileptic fit.
21	37	"	Typhoid	"	96-112	27-30	101-103°	"	6	R.	

A little girl of 4 years gradually developed a short, incessant and annoying cough. It was so frequent that not five waking minutes passed without her coughing one or more times. When 8 years old she sustained an attack of pneumonic fever, locally affecting the apex of the right lung, which ran an ordinary course and terminated by crisis on the fourth day. During this time her habitual cough was replaced by that characteristic of pneumonic fever, but with the advent of convalescence it again returned. Investigation showed the chronic cough to be due to a large mass of inspissated cerumen in the right auditory meatus, the removal of which instantly and permanently relieved it.

I have long shared the opinion of Juergensen[58] that the very frequent, dry, painful and teasing cough of the early stages of pneumonic fever is very seldom, or never, beneficial, is always disagreeable and frequently detrimental to the patient. It is clear that when fluids accumulate in the bronchi, cough of frequency and force sufficient to expel them is necessary, but when the bronchial secretions are scanty or absent it would be difficult to indicate in what manner a frequent and harassing cough can possibly benefit the sufferer. Not only is such a cough painful and disturbing, but from the insufficient rest which it entails, and the pulmonary excitement occasioned, I am convinced that it is decidedly injurious to the patient.

EXPECTORATION.

Expectoration, like cough, is a symptom which is usually present[59] to a greater or less extent in pneumonic fever, although it is sometimes altogether absent.[60] It is necessarily absent in those cases in which there is no cough, and in those persons, children mainly, who are unable to expectorate.[61] It is also frequently absent in those cases in which the cough is very weak, or infrequent, and in the senile,[62] latent,[63] rheumatic[64] and some other forms of the disease.[65]

It was absent in 5 per cent. of Chomel's ;[66] 11 per cent. of Briquet's ;[67] in 7.3 per cent. of Dietl's 750 cases ;[68] in 16 per cent. of Wunderlich's 50 cases ;[69] and 6 per cent. of my cases. In my own cases I have excluded young children.

Buhl[70] thinks that absence of expectoration is due to the fact that the exudation matter is confined to the air cells and that the finest bronchial tubes remain free from inflammatory implication.[71] In every one of my cases, however, the apparent cause was weakness or absence of cough. It has been asserted that expectoration is absent in a larger proportion of cases when the apex is the part of the lung locally affected than when the base is inflamed.[72] It is probable, however, that if such be indeed the fact, other reasons, such as weakness, etc., might be brought forward to account for the phenomenon without attributing it to the local seat of the disease.

Gairdner[73] has advanced the theory that the bronchial tubes act in a manner similar to the bowels and eject their contents by peristalsis. Accepting this theory, which is unsupported by proof, one might readily suppose that expectoration of bronchial fluids would be more difficult from some parts of the lung than from others.

Absence of expectoration has always been thought to be an unfavorable circumstance in pneumonic fever.

Galen[74] says that the most hopeless cases are those rare ones in which expectoration is absent. Avicenna[75] views this occurrence with alarm. Van Swieten[76] thought the inflamed lung was relieved and cured by the expectoration, and that its absence was one of the most unfortunate symptoms which could occur. Cullen[77] was of the opinion that recovery rarely occurred without expectoration. Absence of expectoration is thought by Jacobi[78] to be an almost inevitably fatal sign.[79]

If the absence of expectoration is due to blunted perception or lack of power to bring up matters in the bronchi it is a symptom of evil import, but if there is no material in the bronchi to be ejected the sign is not unfavorable, but rather the contrary.[80]

Chomel[81] thought that diarrhœa often took the place of the bronchial secretion in the cases with no expectoration. In none of these cases in my collection was diarrhœa a prominent symptom.[82]

In a considerable number of cases expectoration, although not absent, is present so scantily as to pass unrecognized unless special attention is directed toward it.[83]

In general, expectoration appears a short time after the beginning of the cough, but in some instances it is very late in appearing,[84] perhaps not until resolution has begun.[85] Again, it may be free enough in the beginning of the attack and so continue for a period, to be gradually or suddenly suppressed.[86] This is a very unfavorable symptom, inasmuch as it indicates a dangerous failure of the respiratory reflexes or of muscular power. This is especially the case if the other signs and symptoms indicate the presence of fluids in the air passages, extension of hepatization or increased severity of the general disease. Under such circumstances a speedily fatal termination may be safely predicted. I do not recollect ever having seen a patient recover under these conditions, and this appears to have been the experience of others.[87]

Andral,[88] with others, attributes the fatal issue in these cases to the occurrence of asphyxia from the accumulated secretions, but this is plainly an error. The parts of the lung which furnish these secretions are already practically impermeable to air, and certainly no great harm can come, *per se*, from the blocking up of the bronchi of these parts. Again, when such cases come to the autopsical table, the result fails to support the proposition that the bronchi of the other parts are filled to any extraordinary degree with these matters. Death follows the cause of the suppression, and this cause is a failure of the vital forces of the entire system and not of the lungs alone.

It has been supposed that the expectoration might be diminished or suppressed by profuse purgation,[89] unreasonable bleedings[90] and other perturbating and depressing therapeutic measures.[91]

The expectoration of pneumonic fever in its physical characteristics is quite peculiar to the disease, and is practically pathognomonic.[92] In the beginning it is white, frothy, viscid and often specked or streaked upon the surface with minute quantities of blood. The sputæ are transparent or translucent, have no definite shape, float upon water and do not adhere to the sides of the vessel, although they adhere slowly to each other. As the attack progresses the color gradually changes to a rusty tinge, the admixture of air is less and it is not so frothy, it becomes more viscid and the blood, which is present in greater or less quantity and gives the expectoration its color, is very intimately mixed with the other elements present. The sputæ are translucent or opaque, sink or float beneath the surface in water,

run together and are so viscid that they not only blend intimately together, but they also adhere so tenaciously to the sides and bottom of the vessel that it may be inverted without the mass flowing out. They also cling closely to the sides of the mouth, teeth and lips, so that the patient is compelled to remove them with a cloth. This is the ordinary and typical expectoration of pneumonic fever after the disease has been fully developed.[73] It usually attains these characteristics in the first days of the disease and retains them until resolution begins. With the decline of the disease the sanguineous elements disappear from the expectoration and it becomes yellowish, creamy, less viscid and heavier than before. The sputæ are large, numular, sink in water and adhere together, but they no longer cling to the sides of the cup. The amount of the expectorate is at first small, increasing to a total of from one to six ounces[74] in twenty-four hours at the height of the disease, gradually diminishing afterwards[75] and disappearing entirely before convalescence is completed. It forms only a small part of the exudate to be removed from the air cells. This statement will be more fully appreciated when it is considered that only a small portion of the expectoration comes from the air cells, the major portion being bronchial secretion.[76]

The basis of the pneumonic expectoration is water, albumin, mucus, fat and salts, with which the other more or less adventitious elements are mixed. Water forms from 87.3 per cent. to 97.1 per cent. of the total quantity.

The percentage of water in four analyses made by Biermer[77] was 94.5, 87.3, 96.1 and 89.0 respectively. In three analyses made by Renket[78] it was 90.9, 97.1 and 97.1 respectively.

The percentage of water to the solids in pneumonic sputa bears a very close relation to the amount of water in the blood.[79] Albumin forms about 3 per cent. of the sputa.[80] It is derived from the alveolar exudation and is met with only after hepatization has begun. The viscidity depends upon the mucus, which is present in about 1 per cent.[81] It is supplied by the inflamed bronchial mucous membrane.[82] The salts constitute about 0.8 per cent. of the expectoration,[83] and of these the chlorides form about one-half.[84]

According to Bamberger[85] pneumonic sputa contains no alkaline phosphates, while 10 to 14 per cent. of the salts of catarrhal expectoration belong to this class. In catarrhal sputa the soda is to the potash as 31:26, but in that of pneumonic fever it is 15:41. Sulphuric acid is present in the two forms of expectoration in the proportion of 3 to 8 respectively. The amount of nitrogen present is absolutely and relatively less than in phthisis.[87]

The expectoration is usually neutral or slightly alkaline,[88] although in rare cases I have found it acid.[89] The acidity, when present, is probably due to the presence of pneumonic acid, which is increased in pneumonic inflammation.[90]

Sugar[91] sometimes exists in the sputa in considerable quantities, due, probably to the same causes which account for the saccharine elements in diabetic urine.

Tyrosin has been found in the sputa of at least one pneumonic patient, unaccompanied by jaundice.[92]

Pneumonic expectoration usually has an insipid taste,[93] although it may be sweet from the presence of sugar, bitter from admixture of bile, salty from the presence of the chloride of sodium, especially during resolution, or so acrid as to cause soreness of the pharynx[94] and other mucous surfaces.[95]

The amount of blood contained in the expectoration varies infinitely. Some cases pursue their course with simply a mucus expectoration and unmixed with blood, whilst in others the sputas are so bloody as to be hemoptysical, with every imaginable grade between these extremes. Oxidation of the blood gives to the sputa the various shades of red, brown, yellow, orange, green, etc., through which it passes. The sanguineous element generally appears during the first two days of the attack, although it may be longer delayed, or even remain absent.

Grisolle[96] found that, in 131 cases, blood first made its appearance on the first day in forty-five cases, on the second day in fifty-six cases, and on the third and fourth days in fourteen cases each. Chomel[97] found blood absent in three of 125 cases. An uncolored sputa belongs to the history of certain epidemics, *e.g.*, the French epidemic of 1837.[98]

I have not met with any facts implying that the sanguineous elements are found in greater or less abundance in different states of the system, as to the amount and character of the circulating medium present, as in plethora, anemia, chlorosis, etc.

Juergensen,[100] however, is of the opinion that the expectoration is often hemorrhagic in the case of drunkards. Others consider the sanguineous element present in less quantity in the aged than in the adult.[101] In children, also, the expectoration is less bloody than at a later period of life.[102] It is true that in the case of young children we do not see the sputa, except sometimes as it is vomited, yet in almost every case it may be seen in this manner.

Actual hemoptysis in pneumonic fever[103] is rare,[104] although cases of great severity, even to fatality, have been observed.[105]

Peteaux[106] records the case of a robust man, aged 45, who was attacked with pneumonic fever and expectorated on the fourth or fifth day, at one time, a pint of bright blood.[107] At the autopsy, some days later, the ordinary appearances of inflammation of the entire right lung was found, but the point from whence the hemorrhage proceeded eluded discovery.

Hemoptysis may indicate the presence of coëxistent tuberculosis[108] or organic cardiac disease.[109] The ancients considered hemorrhagic expectoration as being especially dangerous.[110]

Rusty sputa occasionally continue for a long time. Walshe[111] says that it may persist for a fortnight. Fox[112] gives nine days as the limit. Stokes[113] saw a patient in whom it continued for several weeks after the physical signs had disappeared. Andral[114] noticed it continue for nineteen days—nine days after the disappearance of the physical signs.[115] I have seen it continue for a long period in several cases—in one for forty days.

The blood in the pneumonic expectoration is derived from the dilated capillaries ramifying upon the surface of the air cells and the smaller bronchi.

It is the changes by oxidation and disintegration, of the sanguineous elements that causes the peculiar and curious colorings sometimes met with in pneumonic sputæ.

Of these chromatic changes the green[116] has attracted the greatest curiosity. In the presence of an alkali the coloring matter of the blood splits up into albuminoid and hematin, with a green color result-

ing.[117] The majority of instances of green sputa are due to this cause, although true biliary expectoration certainly does sometimes occur, as evidenced by the presence of the coloring matter of the bile.[118] It is the presence of this greenish expectoration in some cases which has given "bilious pneumonia" [119] a place in the nosological scale with so many physicians. I am, however, inclined to think, with Juergensen [120] and others, that the term should be abolished from use.

In one of my cases, during convalescence, the expectoration assumed, upon standing for a prolonged period, a fine and peculiar grass-green color. It was only by accident that my attention was called to this point in the case, and the phenomena may have been present in others without my cognizance. The patient, a young man of intemperate habits, had a very severe attack of pneumonic fever, with consolidation of the greater part of the right lung. From the beginning the expectoration was very free and so sanguineous as to well merit the appellation "bloody." Crisis, with colliquative sweating and slight collapse, occurred on the seventh day, whilst the expectoration was still quite profuse, although it had assumed a dark gray color and was expelled in masses of considerable size and consistence. Two days later a specimen of the expectoration, which had been standing in the cup for thirty-six hours, was brought to me for inspection. The messenger was very much astonished when he removed the covering from the specimen, which was of a greenish gray color, for, he assured me, it was of a pure green color when he had started from home. I placed the glass at rest and after a few hours the contents presented a very remarkable appearance. A thick grayish precipitate had fallen to the bottom, whilst the supernatant fluid was grass-green in color and presented a most beautiful appearance by transmitted light. On the following day I observed a small quantity of the sputa in a basin, and on the surface of this there was a thin stratum of a similar greenish fluid.

At the time I attributed the green color to a coloring of the serous portion of the expectorate by the oxidized coloring matter of the escaped blood and therefore did not give it that careful examination which it deserved. I have been able to find notices of but two similar cases,[120] and in these the coloring matter was proven to be vegetable spores. When potash was added the green color became intensified, whilst acids, ether and alcohol produced no effect. A few drops of the colored fluid was added to milk and a greenish crust was developed after a few hours' standing. Under the microscope there were to be seen numerous active vibrios, greenish spores and minute glistening granules which were evidently stumps of the greenish spore. The same appearance was found in the crust developed upon the inoculated milk.[121]

Even blue expectoration has been noticed [122] in at least one case. Sometimes the expectoration is of such color, odor or consistence as to resemble pure, gangrenous matter, the juice of prunes, currant jelly, the lees of wine, the juice of licorice, mucilage, glue, etc. These dark sputæ are usually expectorated with greater ease and facility than the lighter colored. They have always been considered as being of great import.[123]

A very peculiar sputa, resembling a thick mucilage[124] or glue,[125] colored a brownish red and which escapes in a single sheet when the vessel is inclined, always indicates a dangerous case.

That the various shades of color which the pneumonic expectoration assumes is due to oxidation of the sanguineous elements, and not from any variation in its original composition, seems proven by the fact that no matter in whatever proportion the blood is mixed with a mucilaginous fluid the pneumonic shades can not be produced.[126]

Under the microscope the blood corpuscles are not closely approximated, but are separated from each other, or are in contact only at their edges.[127] The epithelial cells are often colored[128] the shade of the expectoration, but they may remain unaltered in size and shape, although this is unusual.[129] Black pigment is found not infrequently in some geographical localities.[130] There is also seen minute or larger masses of fibrine, derived from the finer ramifications of the bronchial tree, infundibula and air cells. They are firm coagula, enveloped in the mucus of the sputa, are of a whitish-yellow color, lightly tinged with red, and adhere closely to the sides of the vessel. They become more easily recognizable when washed, although washing decolorizes them. They are composed entirely of fibrine, and may be dichotomously branched, forming more or less perfect casts of the finer bronchi. During the height of the disease they may be expelled in masses of considerable size,[131] but during its decline they are smaller, more or less disintegrated and are not so easily recognized as being parts of casts of a branched tree. They are met with in the vast majority of cases,[132] but are most abundant in those having a powerful cough as considerable force is required to dislodge them. They were noticed by Tulpius,[133] Reynaud,[134] and others, but Remak[135] first pointed out their true nature.[136] Casts such as those described are found only in pneumonic fever,[137] although in another form they are seen in fibrinous bronchitis.[138]

Spiral and central fibers have also been observed in some cases. When these are accompanied by Leyden's crystals the sputum is said to be characteristic of asthma,[139] but they are observed in other diseases also.[140] The pneumococcus may be demonstrated in some instances by careful manipulation.[142]

Place the twenty-four hours' sputa in a conical glass and let it stand in a temperature of from 92 to 102 degrees for twenty-four hours. The thicker portion of the sputa will settle to the bottom and a portion of this is to be examined, as it is easier manipulated and more apt to contain the germs. The proper reagents are to be used for staining.[142]

Various other microscopical appearances may be observed[143] and will well repay careful study.

PAIN.

Pain, like cough and expectoration, is almost always present in pneumonic fever.[144]

It was present in all of Gerhard's[145] cases; in 98 per cent. of Chomel's[146] cases; in 92 per cent. of Doubleday's[147] cases; in 90 per cent. of Grisolle's[148] cases and in 98 per cent. of my own cases, excluding young children who were unable to make known the fact.

It generally comes on very early in the attack[149] and rapidly attains its maximum intensity. In rare cases it may precede by a few hours, or even several days,[150] the appearance of other symptoms.[151] In other cases, also rare, pain may be more or less delayed in its appearance,[152] or remain absent.[153]

After attaining its maximum intensity it continues unabated for a few days to gradually decline in severity and cease on the third or fourth day, or at least some time before the end of the attack.[154] This subsidence of the pain is a part of the natural his-

tory of the disease and occurs independently of remedies for its relief.[155] In rare cases pain may continue for a long time[156]—even far into convalescence.

The pain may be extensively diffused over the chest or, and this is usually the case, it may be confined to a single circumscribed spot which can be covered by the end of the patient's finger.

This last is an important point in the differentiating this pain from that due to bronchitis. In the latter the patient, in locating the pain, instinctively places his open hand over the painful area, while in pneumonic fever he will inspire deeply, so as to reassure himself as to where the painful spot is situate, and will locate it with the point of the extended finger.

The pain is usually located over the seat of the local inflammation, or on a somewhat lower level. Thus when the apex is affected the pain is referred to the level of the third or fourth rib, or still lower, and if the base is the part inflamed it is often located below the diaphragm. Children very frequently refer the pain to the scrobicutus cordis or abdomen.[157] Even adults not infrequently refer the pain to the pit of the stomach.[158] Although the pain is usually located on the affected side—the neighborhood of the nipple being a favorite spot—yet it may be referred to some point on the opposite side.[159] In case the local inflammation is double the pain is often confined to one side only,[160] as I have repeatedly observed. The pain not infrequently radiates from a central point on the chest towards the shoulders, loins, hips, etc., or it may be confined to these distant localities.[161]

In character the pain varies considerably in different cases and will be described with a variety of adjectives by various patients. Generally it will be denominated a stitch,[162] a lancinating,[163] or a burning[164] pain. In intensity it varies from a mere sense of uneasiness to the most agonizing suffering,[165] but it is almost always quite severe and distressing,[166] especially at the beginning of the attack.

Besides the pain there is noticeable, in most cases, an indescribable but most uncomfortable sensation of thoracic oppression, especially of the affected side, which has been compared to the pressure of a heavy weight, or the compression of a vice. This oppression is probably due to the sanguineous congestion of the lung and the deposition of exudative material in the pulmonary textures. Wittich[167] considers this peculiar oppression pathognomonic of pneumonic fever. This oppression, unlike the acute pain, often continues throughout the entire attack. In many cases, especially late in the course of the disease, there is present diffuse thoracic soreness.

The amount and intensity of the pain, oppression and soreness varies in different cases and epidemics[168] and bears no definite relation to the extent and character of the pulmonary lesions. A large proportion of the lungs may be affected with no pain,[169] while a trifling amount of local inflammation may give rise to the most excruciating suffering.

Painful hysterical symptoms may prove very annoying. Davis[170] reports the case of a young lady who had excruciating pains, vacillating from the left side of the chest to the head for several days before pneumonic fever, complicated by endocarditis, could be diagnosed. Twenty-four hours later convulsions, with intense pain, set in, followed by death in twelve hours.

Pain is increased or developed by deep breathing, coughing, talking, sneezing and pressure[171] in the intercostal space over the seat of inflammation, or an upward pressure below the ribs. I have very often elicited pain by such pressure when the patients declared themselves free from this symptom. Early in the attack it is a diagnostic aid of considerable value, but it should not be employed at a later period.

The pain may be associated with cutaneous hyperæsthesia.[172] In one of my cases this was so marked that the lightest touch caused the most excruciating suffering.

The actual seat and cause of the pneumonic pain has not as yet been clearly elucidated. The old and very popular opinion locates it in the inflamed pleura.[173] This theory is rendered weak from the fact that pain is often absent in simple pleurisy and may be present in pneumonic fever without pleural involvement.[174] That the pain is not due to the presence of the exudative material is clear from the fact that it ceases while the pressure remains.[175]

I am of the opinion, without being able to give any very satisfactory reason for it, that the pain has its origin in, and depends upon inflammation of, both the pulmonary and pleural textures, or either separately. I also believe that the pain due entirely to the pulmonary, is usually more diffused and less acute than that exclusively from the pleural lesions.

34 Washington St.

[1] See Thucydides, Opera, Lib. II, cap. xlix—ti;—Hippocrates;—Inter. Adfec., Lib. II;—Coelius Aurelianus, Acut. Morb. Lib. II, cap. xxv, et xxix, and every writer since their days.

[2] Vorlesunger ü Pneumonie, Leipzig, 1841, S. 28.

[3a] Die Aderlasse in Lungenentzündung, Wein, 1853, S. 30.

[4] Traté de la Pneumonie, Paris, 1841.

[5] See Fox, Reynold's Syst. Med. Phila., 1880, Vol. II, p. 217.

[6] See Clark, London Lancet, N. Y., 1881, Vol. I, p. 253;—Dietl. Pneumonie, Wein, 1818, S. 54;—Flint, Prac. Med. Phil., 1868, p. 177;—Fox, Op. cit., p. 165;—Gerhard, Dis. Chest, Phila., 1869, p. 196;—Grisolle, Op. cit., p. 219;—Huss, Lungenentzündung, Leipzig, 1865, S. 34;— Dis. Chest, N. Y., 1880, p. 220;—Mussy, Gaz. des Hop., Auvril, 9, 1846;—Sturges, Pneumonia, London, 1876, p. 34;—Trousseau, Clin. Med., Phila. 1872, Vol. I, p. 661;—Wilson, On Fevers, N. Y., 1881, p. 182; Fiemssen, Pleuritis u. Pneumonie, Berlin, 1862, S. 220. Et al.

[7] U. S. Marine Hospt. Rpts., 1886, p. 172 Another case, p. 273.

[7a] See also Satterthwaite, Phila. Med. News, Jan. 5, 1889, p. 4.

[8] See Copland, Med. Dic., N. Y., 1855, Vol. II, p. 276;—Hewitt, Pathology, of Whooping Cough, London, 1855; Radcliffe, London Lancet, N. Y., 1856, Vol. II, p. 279;—Smith, Med. Chir. Trans., Vol. xvii, 1834;—Tanner, Dis. Infancy, Phil. 1871, p. 290; Trausseau. Clin. Med., Phila., 1872, Vol. I, p. 131;—Vogel, N. Y. Med. Rec., May 14, 1887, p. 555. Et al.

[9] Ohio Med. Recorder, Apr. 1881, p. 498.

[10] See Holt, N. Y. Med. Rec., Feb. 14, 1885, p. 177.

[11] See Boston Med and Surg. Jour., Jan. 23 and Feb. 20, 1879;—Dutcher, Cincinnati Lancet and Observer, Jan. 1861, p. 10;—Fleury, Bull. de la Soc. Anat., T. xiii, p. 165;—Huxham, Epidem. Dis., London, 1748, p. 59;—Lequin, Pneumonie, Wein, 1853, S. 43;—Rose, Cruise of the Corwin, Wash., 1883, p. 16;—Sturges, Pneumonia, Lond., 1876, p. 5; Thucydides, Opera;—et. al.

[12] Chomel, Pneumonie, Leipzig, 1841, S. 128;—Huss, Lungenentzündung, Leipzig, 1861, S. 34;—Watson, Prac. Phys., Phila., 1845, p. 580.

[13] See Helss, Inaug. Diss. Wünchen, 1857, S. 7.

[14] See Friedlebru, Arch. f. Phys. Heilk., 1847, S. 16.

[15] Holt, N. Y. Med. Rec., Apr. 8, 1888, p. 385. and Feb. 14, 1885, p. 174.

[16] See Helss, Op. cit., S. 8;—Raven, London. Practitioner, Vol. xxx, p. 34.

[17] Chomel, Op. cit., S. 128. I have seen this in adults.

[18] Rilliet et Barthez, Mal. des Enfants, Paris, 1838, T. III.

[19] See Wells, Jour. Am. Med. Ass., Dec. 19, 1885, p. 676.

[20] See Juergensen's Reinsen's Handb. d. Spec. Path, u. Therap. Leipzig, 1877, Bd. v, S. 88.

[21] See Bryant, London Lancet, N. Y., 1862, Vol. II, p. 53;—Cooke, Ibid., p. 54; Coulson, Ibid., p. 54;—Desnos, La France Méd., Oct. 20, 1885;—Gaz. des Hôp., Mar. 17, 1849;—Hornidge, Holmes' Syst. Surg., Phila., 1881, Vol. I, p. 481;—Wyman, Jour. Am. Med. Ass., Nov. 7, 1887;—et al.

[21a] Med. Chir. Obsv., No. 614.

[21b] See Goodell, Am. Jour. Med. Sci., Jan., 1871, p. 63.

[22] See Post, London Lancet, 1887, Vol. II, p. 353;—et al.

[22a] See Gerhard, Berliner k. Wochenschr., Mar. 12, 1888, S. 205;—Meinère, Arch. Gén. de Méd., 1824, p. 353;—Roger, Arch. Gén. de Méd., 1862, T. II, p. 129.

[23] Med. Chir. Trans., Vol. lxv, and Artificial Respiration, 1887.

[23a] See also Huss, Op. cit.;—Dujol, Etude Clin. de la Pneumonie, etc., Paris, 1876;—Northup, N. Y. Med. Rec., Feb. 16, 1889, p. 192;—Samter, Inaug. Dissert., Breslau, 1881, S. 32;—Pause, Op. cit.

[24] The bursting pressure of the adult lung is from three to nine inches of mercury. Such a pressure is far beyond anything possible for the patient to attain, no matter how powerful the cough. See Hutchinson, Capacität d. Lungen, Braunschweig, 1849;—West, Op. cit.;—et al.

[25] Wells, Jour. Am. Med. Ass., Dec. 19, 1885, p. 676.

[26] See Webster, N. Y. Med. Jour., May 14, 1887, p. 544.

[27] See Bumstead, Annals of Surgery, Feb., 1886, p. 139.

[28] See Wells, Jour. Am. Med. Ass., Dec. 19, 1885, p. 675.

[29] See McKenzie, Am. Jour. Med. Sci., July, 1863;—Robinson, N. Y. Med. Jour., July 18, 1885, p. 64. Sneezing may take the place of the cough, as in the plague of Athens. See Thucydides, Op. cit.

[30] See Kohts, Virchow's Archiv., May 6, 1874, Bd. lxvi, S. 191; et al.
[31] Krismer, 1819. Quoted by Kohts, Op. cit.
[32] Hiecough may also occur.
[33] See Naunyn, Deutsch. Arch. f. k. Med., May, 1879.
[34] See Brunton, Pharmacology, Phila., 1883, p. 221.
[35] See Wills, Schmidt's Jahrb., 1883;—et al.
[36] See Heiss, Inaug. Diss, München, 1857, S. 8. It is uncertain whether irritation of the pulmonary parenchyma alone can produce cough. See Kohts, Op. cit.
[37] See Meyer, Correspondenzb. f. Schweiger Aerzte, 1876, Nr. 1.
[38] Ziemssen's Handb. d. Spec. Path. u. Therap., Bd. v, S. 88.
[39] See Aretæus, De Caus. et Sig. Acut. Morb., Lib. ii, cap. i;—Avicenna, Cannon;—Baglivi, Med. Prax., 1696;—Ballonius, Epidem. et Ephemer., 1574, Lib. ii; Biermer, Lehre von Auswurf, Würz., 1855; Celsus, De Med., Lib. iv, cap. vii;—Coelius Aurelianus, Acut. Morb., Lib. ii, cap. i; Dietl, Die Aderlasse ind. Lungenentz., Wien, 1853, S. 31;—Hippocrates, Opera.; —Monro, Edinb. Med. and Surg. Jour., 1805;—Pearson, Phil. Trans., 1809; Lommius, Obsv. Med., Lib. iii, Antv., 1560;—Seidelius, Sputo et Muco, 1590;—Van Swieten, Commentz. Aphor. Boerhaavi, 1742;—et al.
[40] See Andral, Med. Clin., Phila., 1843, Vol. ii, p. 194;—Baglivi, Op. cit.;—Biermer, Op. cit., S. 120;—Burt. Phys. Explor. Chest, N. Y., 1889, p. 27;—Chomel, Pneumonie, Leipzig, 1841, S. 128;—Clark, N. Y. Med. Gaz., 1880;—Coelius Aurelianus, Op. cit.;—Cullen, Prac. Phys., Phila., 1788, Vol. i, p. 184;—Dietl, Pneumonie, Wien, 1848;—Fox, Reynolds' Syst. Med., Phila., 1880, Vol. ii, p. 166;—Frank, Cur. Hom. Morb., Vienne, 1792; Juergensen, Ziemssen's Handb. d. Spec. Path. u. Therap., Bd. v, 1877, S. 1. et seq.;—Morgagni, De Sed. et Caus. Morb., Lond., 1706;—Mussy, Gaz. des Hôp., Avr. 9, 1846;—Noyes, Am. Lancet, 1887;—Satterthwaite, Phila. Med. News, Jan. 5, 1889, p. 4;—Scott, London Lancet, N. Y., 1862, Vol. i, p. 350; —Stokes, London Lancet, N. Y., 1855, Vol. ii, p. 121;—Sturges, Nat. Hist. Pneumonia, London, 1876, p. 36;—Sydenham, Op. Work, London, 1788, Vol. i, p. 330, et seq.;—Todd, Med. Times and Gaz., May 15, 1852, p. 483;—Tweedie, London Lancet. N. Y., 1860, Vol. ii, p. 7;—Van Swieten, Op. cit.;—Walshe, Diseases of the Lungs, Phila., 1860, p. 289;—Watson, Prac. Phys., Phila., 1845, p. 580;—Williams, London Lancet, N. Y., 1861, Vol. ii, p. 234; —Wilson, On Fevers, N. Y., 1881, p. 182;—Briquet, Schmidt's Jahrb., Bd. xxvii, S. 334;—et al.
[41] Even in adults. See Homburger, Inaug. Dissert., Strassb., 1879, S. 101.
[42] Often due to inelasticity of the thoracic walls. See Wyss, Fortschritt d. Med., Jan. 20, 1888.
[43] Andral, Op. cit., p. 153.
[44] Sturges, Op. cit., p. 77.
[45] Including the alcoholic.
[46] Op. cit., S. 128, u. S. 131.
[47] Op. cit., S. 334.
[48] Op. cit., S. 31.
[49] Inaug. Dissert., Tül., 1858, S. 29.
[50] Lungenentzündung, München, 1872.
[51] See also Andral, Op. cit.
[52] Fox, Op. cit., p. 166;—Walshe, Op. cit., p. 288. Of 14 cases reported by Grisolle—Trinité's Pneumonie, Paris, 1864—in which expectoration was absent, 7 were apical.
[53] Glasgow, Med. Jour., July, 1863, p. 137, and Lancet, N. Y., 1863, Vol. ii.
[54] Opera Omnia. Lib. ii, cap. v.
[55] Cannonis, Lib. v.
[56] Op. cit.
[57] Op. cit.
[58] N. Y. Med. Rec., March 6, 1886, p. 288.
[59] See also Alexander Trallianus, Opera Omnia, Perschmann's Ed., Wien, 1878.
[60] Andral, Op. cit., p. 194;—Frank, Op. cit.
[61] Op. cit., S. 182.
[62] See also Sturges, Op. cit., p. 36.
[63] See D'Espine, New York Med. Rec., Sept. 17, 1887, p. 375. See also Cameron, London Lancet, 1890, Vol. i, p. 425.
[64] See also Kay, Ohio Med. Recorder, Apr., 1881, p. 408.
[65] See also Huss, Lungenentzündung, Leipzig, 1861, S. 35.
[66] See also Biermer, Op. cit., S. 120;—Goodridge, Bristol Med.-Chir. Jour., March, 1887;—Hippocrates, Op. cit.;—Huss, Op. cit.;—et al.
[67] Andral, Op. cit., p. 129;—Chomel, Op. cit., S. 231;—Dietl, Op. cit., S. 58.
[68] Op. cit.
[69] Baglivi, Op. cit.;—Fox, Op. cit., p. 166.
[70] Fox, Op. cit.;—Morgagni, Op. cit.;—Sydenham, Op. cit.
[71] Frank, Op. cit., however, recommended bleeding for the restoration of suspended respiration.
[72] See also Avicenna, Op. cit., Lib. iii, Tract. 4, cap. 1;—Lépine, Pneumonie, Wien, 1888, S. 43;—Robinson, Phila. Med. News, Jan. 5, 1889, p. 25; —Todd, Med. Times and Gaz., May 15, 1852, p. 483.
[73] For further information see Alexander Trallianus, De Arte Med., Lib. xii;—Biermer, Lehre vom Auswurf, Würzb., 1855;—Burt, Op. cit., p. 27;—Coelius Aurelianus, Acut Passion., Lib. ii, cap. xxvii;—Gunsburg, Arch. f. Phys. Heilk., Stuttgart, Hasse's Archiv., Bd. vi, 1845;—Hippocrates, Op. cit.;—Johannes Actuarius, Med. Meth. Medendi;—Louis, Phthisis, Boston, 1836, p. 66;—Mesuë, Prac. Med.;—Morgagni, De Sed. et Caus. Morb., Epist. xxi;—Paulus Aeginatus, De re Med., Lib. vii; —Rendu, Diag. u. Path. Untersuch., Berlin, 1845;—Rhases, Med. et Almansor;—Van Swieten, Op. cit.;—Zehentmeyer, Zeitsch. d. Weiner Aerzte, 1845;—et. al.
[74] See also Biermer, Op. cit., S. 112;—Gerhard, Diseases of the Chest, Phila. 1860, p. 197.
[75] Biermer, Op. cit., S. 118, states that the quantity rises to eight or ten ounces in the twenty-four hours during the later stages of the malady, but this is opposed to my experience.
[76] See Riesel-Huppert, Arch. d. Heilk., 1869.
[77] Op. cit., S. 115, et seq.
[78] Zeitsch. f. Biolog., 1875.
[79] See Andral et Gavarret, Ann. de Chiem. et de Phys., T. lxxv;—Scherer, Chem. u. Microscop. Untersuch., Heidelb., 1843.
[80] Reuk, Op. cit.
[81] Reuk, Op. cit.
[82] The walls of the bronchi do not secrete mucus in a state of health, the surfaces being moistened by an aqueous exhalation.
[83] Reuk, Op. cit.
[84] See Beale, Med.-Chir. Trans., Vol. xxxv, 1852.
[85] Würzb. Med. Zeitschr., Bd. ii, Nr. 5 u. 6.
[86] See Fox, Op. cit., p. 167.
[87] See Panoff, Inaug. Dissert., St. Petersburg, 1889, Nr. 2.
[88] See also Baker, Causation of Pneumonia, Lansing, 1888, p. 290;—Flint, Physiology, Vol. i, p. 132;—Wright, London Med. Times, 1884, p. 200.
[89] See also Fox, Op. cit., p. 167;—et al.
[90] Beale, Op. cit.;—Robin et Verdeil, Chem. Anat. Phys., T. 11, p. 460; —Verdeil, Gaz. Méd. de Paris, 1851, p. 777;—et al.
[91] Beale, Op. cit.;—Fox, Op. cit., p. 166;—Francis, London Med. Gaz., Feb., 1847;—Frick, Am. Jour. Med. Sci., 1852;—Heller, Goal's Diagnosis, 1845;—Juergensen, Op. cit., S. 107;—Simon, Hufeland's Jour., 1841;—Walshe, Op. cit., p. 289;—et al.
[92] See Bleuler, Inaug. Diss., Zürich, 1865, S. 37.
[93] Biermer, Op. cit., S. 112;—Prosper Alpinus, De Præsagienda Vita et Morte, etc., Venet., 1601, Lib. vii.
[94] See Huxham, Epidem. Dis., London, 1745, Vol. ii, p. 59.
[95] For further information on the chemistry of the pneumonic expectoration, see Baglivi, Prac. Med., Lugd., 1696;—Biermer, Op. cit., S. 119;—Bibra, Untersuch., Berlin, 1845;—Caventon, Ann. d. Chem., 1843;—Gluge, Casper's Wochenschr., 1837, Nr. 39;—Donné, Arch. Gen. de Méd., 1836;—Henle, Hufeland's Jour., 1838;—Hœfle, Chem. u. Mikroskop., Erlangen, 1848;—Jacubowitsch, Inaug. Diss., Dorpat, 1848;—Leonhardi, Inaug. Diss., Leipzig, 1845;—Munro, Edinb. Med. and Surg. Jour., 1805;—Pierson, Phil. Trans., 1809;—Scherer, Chem. u. Mikroskop. Untersuch., Heidelb., 1843; —Simon, Med. Chem., Berlin, 1842;—Filanus, Inaug. Diss., Amster., 1849; —Vogel, Inaug. Diss., München, 1888;—Wright, London Med. Times, 1844 and 1845;—et al.
[96] Traité de la Pneumonie, p. 217.
[97] Pneumonie, Leipzig, 1841.
[98] Grisolle, Op. cit.
[99] Ziemssen's Handb., Bd. v, S. 108.
[100] Fox, Op. cit., p. 166;—Kaulen, Inaug. Diss., Bonn, 1873.
[101] See also Baginsky, Pneumonie u. Pleuritis, Würzb., 1880;—Holt, N. Y. Med. Rec., March 28, 1885;—Kœttnitz, Inaug. Diss., Halle, 1882, S. 36;—Lépine, Pneumonie, Wien, 1888;—Pause, Pneumonie, S. 113;—Sturges, Pneumonia, 1876;—Tanner, Diseases of Infancy, Phila., 1871;—Ziemssen, Pleuritis u. Pneumonie, Berlin, 1862;—et al.
[102] See Sturges, Op. cit., p. 5;—Cleveland, Clinic, Sept. 1, 1878, p. 98.
[103] See Beale, Op. cit., S. 217. Juergensen (Op. cit.) never saw pure blood as an expectoration in this malady.
[104] Cronigneau, Jour. de Méd. de Paris, June 13, 1889;—Fenn. Therap. Gaz., June, 1885, p. 371;—Peacock, St. Thomas' Hospt. Rpts., Vol. v. 1875; —Stortz, Inaug. Dissert., Würzb., 1884, S. 64.
[105] Thesè de Paris, 1835, p. 20.
[106] Foamy blood usually comes from large bronchi. See Heiss, Inaug. Diss., München, 1857, S. 7.
[107] Fox, Op. cit., p. 165;—Lépine, Op. cit., S. 43;—Walshe, Op. cit., p. 289.
[108] See Huss, Lungenentzündung, Leipzig, 1861.
[109] See Arataeus, Op. cit.;—Galli, De Peste et Peripneum, cum Sputo Sanguineo, Bix, 1635;—Guy de Chauliac, Tract. ii, p. 113;—et al.
[110] Op cit., p. 289.
[111] Op. cit., p. 166.
[112] Dis. Chest, p. 361.
[113] Op. cit.
[114] See also Fox, Op. cit., p. 166.
[115] Volhausen, Inaug. Dissert., Gött., 1879, S. 23.
[116] Lépine, Op. cit., S. 44. [116a] Lépine, Op. cit., S. 44.
[117] See Abloing, Jour. Gen. de Méd., T. lxiii;—Archier, Ibid., T. lxi; —Bailly, Fievres Int., p. 253;—Bianchi, Hist. Hepat., Vol. i, p. 236;—Bonnet, Fievres Int., p. 66, 67;—Doyle, N. O. Med. Jour., Vol. ii, p. 578;—Drake, on Fevers, Phila., 1854; De Renzi, M asmi Paludasi, p. 121;—Eberle, Prac. Med., Phila., 1831, Vol. i, p. 284;—Foster, Stethoscope, Vol. iii, p. 91;—Frank, Med. Prax., Lib. ii, p. 350;—Foley, Rech. en Algerie;—Forsyth, Med. Reporter, p. 353;—Gouraud, Fievres Palustres, p. 103;—Gauzée, Arch. Gen. de Méd., T. iv, p. 71;—Huxham, Op. cit.;—Laennec, Dis. Chest, N. Y., 1830;—La Roche, Pneumonia, Phila., 1854, p. 437;—Maillot, Fies. Intermit., p. 17, p. 41 et p. 127;—Matheson, Charleston Med. Jour., Vol. iii, p. 152;—Matthei, Jour. de la Soc. de Méd. de Parme, ii;—Monton, An Obsn. de Montpellier, T. xxvii, p. 133;—Meli, Suile Febbre Biliosi, p. 54;—Morton, Opera Omnia;—Nepple, Fièvre Intermit., p. 99, p. 124 et. p. 266;—Oliver, N. O. Med. Jour., Vol. 7, p. 387; Pelletan, Mem. de l'Acad. de Méd., T. viii, p. 443;—Potter, Med. Recorder, Vol. iv, p. 464;—Rochoux, Bull. de l'Acad. de Med., T. i, p. 926;—Raymond, Mem. de la Soc. Roy. de Méd., T. iv, p. 510;—Roche et Bérquin, Nouv. Elem., T. i, p. 440;—Strack, Fievres Intermit., Obsv. 32 et 38;—Stoll, Rat. Med., Lib. ii, p. 50;—Sauvages, Nosol. Meth., Lib. ii;—Williams, Med. Reg., Vol. iii, p. 454;—Andral, Op. cit., p. 194;—Lauter, Hist. Med. Bien;—et. al.
[118] Op. cit., S. 140.
[119] See Cornil, Comp. Rend. soc. Biol., 1868, T. v, p. 39;—Rosenbach, Berliner k. Wochenschrift, 1875, S. 645.
[120] For further information on green sputa consult Biermer, Op. cit., S. 120;—Gerhard, Charité Ann., Bd. xiii, 1888;—Lépine, Op. cit., S. 44; Prosper Alpinus, Op. cit., Venet, 1601;—et. al.
[121] For further information on brown sputa consult Biermer, Op. cit., S. 120;—Gerhard, Op. cit.;—Huxham, Op. cit., p. 59;—Prosper Alpinus, Op. cit; Walshe, Op. cit., p. 289;—Watson, Prac. Physic., Phila., 1845, p. 583.
[122] See Andral, Op. cit., p. 136.
[123] Biermer, Op. cit., S. 111.
[124] See Traube, Gesammelte Beiträge.
[125] Biermer, Op. cit., S. 39.
[126] Biermer, Op. cit., S. 36.
[127] For further information see Bühlmann, Schleund Resp. Organe, 1843;—Donné, Kech. sur la Mucus, 1837;—Gruby, Obsv. Path., 1840;—Günsburg, Arch. f. phys. Heilk., 1845;—Henle, Hufeland's Jour., 1838, u. Müller's Arch., 1838;—Hœfle, Chem. u. Mikroskop., 1848;—Leonhardi, Morph. et Chem. Sputor Natura, 1845;—Rheimer, Würz. Phys. Med. Verh., 1852;—Vogel, Inaug. Diss., 1838;—et al.
[128] Makellar, Edinb. Med. Jour., 1845;—Melsene, Comp. Rend., T. xix, 1844;—Morgagni, De Sed. et Caus. Morb., 1766;—Morton, Phthisiology, London, 1689;—Pikford, Arch. f. phys. Heilk., 1847;—et al.
[129] See Lonsdale, London Lancet, N. Y., 1860, Vol. ii;—Lored, Ibid., 1857, Vol. ii, p. 145;—Thierfelder, Arch. f. phys. Heilk., 1854;—et al.
[130] See Bezeth, Nederl. Weekbl., 1852;—Biermer, Op. cit., S. 52;—Guttmann, Phys. Diag., N. Y., 1880, p. 138;—Meerbeck, Ann. de la Soc. d'Anvers, 1846;—Pucheit, Heidelb. Med. Ann., 1848;—et al.
[131] Obsv. Med., Lib. iv, 1641.
[132] Arch. Gen. de Méd., 1835, p. 157.
[133] Diag. u. Path. Untersuchungen, Berlin, 1845.
[134] See also Albers, Rhein Westphal, Correspondenzb., 1845.
[135] See also Biermer, Op. cit., S. 113;—Cadiot, Thèse de Paris;—Gri-

solle, Traité de la Pneumonie, Paris, 1864;—Gubler, Soc. de Biologie, T. iii, 1855;—Lépine, Op. cit., S. 46;—Renon, Thèse de Paris, 1872;—Reynolds, London Lancet, 1889, Vol. ii, p. 997;—Wiedmann, Thèse de Strassb., 1854; Wilks, London Lancet, N. Y., 1855, Vol. ii, p. 48;—Wyts, London Med. Gaz., 1847;—et al.

158 See also Babcock, Jour. Am. Med. Ass., 1887;—Davis, Ibid., 1887;—Englemann, St. Louis Cour. Rec., 1887;—Madigan, Med. Standard, 1887;—Renon, Thèse de Paris, 1872;—Prager Med. Wochenschr., 1887;—Whittaker, Ann. Med. Sci., Phila., 1888;—Charboux, La Normandie Méd., 1887;—et al.

159 Churchmann, Centralb., f. k. Med., 20 Mar., 1885;—Pell, Therap. Gaz., 1885, p. 663;—Vierordt u. Jacksch, Zeitsch. f. k. Med., Bd. ix, Nr. 1;—et al.

160 See N. Y. Med. Rec., Oct. 24, 1885, p. 458.

161 See D'Espine, N. Y. Med. Rec., Sept. 15, 1887, p. 375.

162 See Philip, Edinb. Med. Rev., Nov., 1886;—et al.

163 See Amburger, quoted by Whittaker, Cincinnati Clinic, June 16, 1877, p. 278;—Bühlmann, Inaug. Diss., Bern, 1843;—Heinrich, Hässer's Arch., Bd. vi, 1844, u. Henle's u. Pfeuffer's Zeitschr., Bd. iv, 1845;—Rosenberg, De Microscop. usu in Diag., Gœtt., 1847;—Vogel, Mikroskop., 1841;—Whittaker, Op. cit.;—Zehetmeyer, Zeitschr. d. Wiener Aerzte, 1845;—et al.

164 See Alexander Trallianus, Opera, Lib. v, cap. 1;—Cleghorn, Diseases of Minorica, London, 1762, p. 261;—Cœlius Aurelianus, Acut. Morb., Lib. ii, cap. xxv;—Hippocrates, Opera Omnia;—et al.

165 Am. Jour. Med. Sci., Vol. xiv, p. 328.

166 Pneumonie, Leipzig, 1841, S. 123.

167 N. Y. Med. Rec., March 28, 1845, p. 343.

168 Traité de la Pneumonie, Paris, 1864.

169 Andral, Med. Clin., Phila., 1843, Vol. ii, p. 116;—Doubleday, Op. cit.;—Laragne, Gaz. des hôp., June 24, 1876;—et al.

170 See Andral, Op. cit., p. 186.

171 See Fox, Reynolds' Syst. Med., Phila., 1880, Vol. ii, p. 163;—Heiss, Inaug. Diss., München, 1857, S. 6;—Hermann, Lungenentzündung, Würzb., 1880, S. 35;—Lebert, Berliner k. Wochenschr., Sept. 18, 1871;—et al.

172 See Fox, Op. cit., p. 163;—et al.

173 Bennett, Med. Times and Gaz., Oct. 23, 1853;—Boston Med. and Surg. Jour., Jan. 23, 1879, p. 131;—Fleury, Bull. de la Soc. Anat., T. xiii, p. 165;—Mussy, Gaz. des hôp., Avr. 9, 1846;—Raven, London Practitioner, Vol. xxx, p. 34;—Stokes, London Lancet, N. Y., 1855, Vol. ii, p. 121;—Tweedie, Ibid, 1860, Vol. ii, p. 7;—Wilson, on Fevers, N. Y., 1881, p. 182;—et al.

174 Heiss, Op. cit., S. 8;—Huss, Lungenentzündung, Leipzig, 1861, S. 38;—Laragne, Gaz. des hôp., June 24, 1876;—Lebert, Op. cit.;—et al.

175 This was also noticed by the ancients. See Aretæus, De Caus. et Sig. Acut. Morb., Lib. ii, cap. 1;—Celsus, De Medecina, Lib. iv, cap. vii; et al.

176 Fox, Op. cit., p. 163.

177 See Henoch, Jour. f. Kinderk., 1849, Bd. xiii, S. 8;—Monti, N. Y. Med. Jour., Dec. 1, 1883, p. 602;—et al. It may be offered in objection that children refer *all* pains to the abdomen.

178 In one of my cases pressure over the stomach invariably caused cough.

179 See also Chomel, Op. cit., S. 124;—Gerhard, Dis. Chest, Phila., 1860, p. 90;—Huss, Op. cit., und Deutsche Arch. f. k. Med., Bd. ix, S. 342;—Juergensen, Ziemssen's Handb., Bd. v, S. 90;—Laennec, Dis. Chest, N. Y., 1830;—Swett, Dis. Chest, N. Y., 1856, p. 99;—Wittich, Pneumonie, Erlangen, 1850, S. 15.

180 See Chomel, Op. cit., S. 124.

181 See also Chomel, Op. cit., S. 124;—Heiss, Inaug. Diss., München, 1857, S. 7;—et al.

182 See Cleghorn, Diseases of Minorica, London, 1762, p. 261.

184 See Alexander (of Tralles), Opera, Lib. v, cap. i, et Lib. vi, cap. 1; Cœlius Aurelianus, Acut. Morb., Lib. ii, cap. xxv;—Huxham, Epidem. Diseases, London, 1748, Vol. ii, p. 59;—et al.

184 Aretæus, De Caus et Sig. Acut. Morb.

185 See Heiss, Op. cit., S. 8.

186 See U. S. Marine Hospt. Rpts., 1887, p. 239.

187 Op. cit., S. 15.

188 See Dutcher, Cin. Lancet and Observer, Jan., 1861, p. 10.

189 See also Dietl, Lungenentzündung, Wien, 1848, S. 59;—et al.

190 Jour. Am. Med. Ass., Oct. 13, 1883, p. 415.

191 See Keating, Phila. Med. News, April 5, 1882, p. 341;—et al.

192 See also Fox, Op. cit., p. 163. There may be also muscular soreness due to rupture of some of the fibers of the muscles of the chest or abdomen. See Juergensen, Op. cit.;—Kœttnitz, Inaug. Dissert., Halle, 1882, S. 30.

193 Aretæus, Op. cit.;—Andral, Op. cit., p. 185;—Gerhard, Op. cit., p. 197;—Green, Quain's Dic. Med., N. Y., 1883, p. 876;—Juergensen, Op. cit., S. 60;—Loomis, Pepper's Syst. Med., Phila., 1885, Vol. iii, p. 200;—Satterthwaite, Phila. Med. News, Jan. 5, 1889, p. 5;—Swett, Op. cit., p. 100;—Watson, Prac. Phys., Phila., 1845, p. 579;—Fox, Op. cit., p. 163;—et al.

194 Chomel, Op. cit., S. 255;—Laennec, Op. cit., p. 220;—Williams, London Lancet, N. Y., 1862, Vol. ii;—et all.

195 See also Heiss, Op. cit., S. 6.

PHILADELPHIA NEWS.

The fact that Pennsylvania has now a law creating a State Examining and Licensing Board has already been noticed in the JOURNAL, but a slight correction should be made in the text of the Act (page 62 *ante*). The legislature did not appropriate the sum of two *hundred* thousand dollars for the purposes of the board, but simply "two thousand dollars" for the first two years' expenses. The last legislature, however, was very liberal in other ways and proved its high appreciation of Philadelphia medical interests by grants of $115,000 to the hospital of the University of Pennsylvania, (the $15,000 being for a maternity department), $110,000 to the hospital of the Jefferson Medical College, $100,000 to the hospital of the Medico-Chirurgical College and $70,000 to the Polyclinic Hospital, besides other grants, all of which will tend directly or indirectly to increase the clinical and teaching facilities of our medical schools.

The Pennsylvania Hospital is building a handsome three story wing on the north side, which will be devoted entirely to surgical cases and will nearly double the capacity of this venerable institution.

Under the auspices of the American Society for the Extension of University Teaching, vacation studies in history, literature and science directed by university specialists have been successfully instituted; the first summer meeting being held in Philadelphia from July 5 to August 2. Of general interest to physicians is the special course of instruction in sanitation and hygiene by Dr. John S. Billings, U. S. A., and A. C. Abbott, consisting of twelve lectures and demonstrations. The University of Pennsylvania has generously placed at the disposal of the summer meeting its college buildings, libraries and laboratories so far as these may be needed for the instruction to be given, so that the first annual meeting is held under very favorable auspices.

The College of Physicians has called the attention of the authorities to the injury to the public health likely to result from the wholesale tearing up of the streets incident upon the substitution of the electric trolly system for horse power on nearly all the city railways, now being done by the Philadelphia Traction Company. In addition to this, the Edison Light Corporation is laying mains and will dig up over a hundred miles of streets during the present season. In the meantime the drainage is obstructed, and street cleaning in many places is out of the question. This is one way of getting ready for an epidemic of cholera, yellow fever, or almost anything. In fact, the death rate of last week was considerably higher than that of a year ago, the increase being mainly in the number of infectious diseases.

On July 10, the brig "Odorilla," Capt. Holland, returned to this port after sixteen months' voyage to Santos, Brazil, where the entire crew and officers (eight men in all) died of yellow fever, the captain alone surviving, as published at the time in THE JOURNAL The vessel is detained and will be thoroughly disinfected at the new stations at the Breakwater and Reedy Island, which have been recently established by the United States government. The former is situated on the Breakwater at Delaware Bay near Cape Henlopen, and the latter in the river near the entrance to the harbor. Farther up the river is the quarantine station at Little Tinecum Island, now entirely under the jurisdiction of the State authorities, which are fully in harmony with the National quarantine service. Since the first of this month, the city of Philadelphia, through its board of health, also coöperates with the State officials, but no longer has any direction or control of the quarantine station. As an additional safeguard against the importation of cholera or yellow fever, it may be stated that the U. S. Marine Hospital service has authorized the organization of a corps of examiners to inspect the immigrant trains from the seacoast, these acting under the immediate direction of Dr. George Purviance, M. H. S. This plan contemplates placing a medical inspector upon each immigrant train, to remain with it to the place of destination, whenever the immigrants have been exposed to cholera, even though the period of incubation be passed. The railroads will be requested to furnish hospital cars, so as to permit prompt isolation of cases, the cars to be furnished with earth closets and means of thorough disinfection.

Poisoning by carbolic acid is not very rare, but two cases recently came to the coroner's notice which might be mentioned: The first was a woman 21 years of age, who quarreled with her husband and drank a quantity of the acid with suicidal intent. Contrary to the usual effects, she suffered great agony, and calling for assistance was taken to the Jefferson College Hospital, where she died shortly afterwards. The second case was a child four years of age, which found in a closet a bottle of carbolic acid and drank a small quantity and promptly died. The parents stated that there had been a case of typhoid fever in the house and an official of the Board of Health had left the bottle of

carbolic acid for disinfecting purposes. This appears to show carelessness on the part of the health board and neglect or ignorance on the part of the parents. It recalls the case of another child five years of age, who drank some carbolic acid from a saucer which had been placed under a sofa, in order to drive away moths or other insects, with the same result. Another child, three years old, ate some yellow substance which he found on a lot and mistook for mustard, of which he was said to be very fond (!); the child was almost immediately seized with convulsions and died within a few hours. The powder was believed to be chrome yellow.

The coroner recently investigated a case of a girl of 11 years, who died of diphtheria. She had been given a number of powders during her illness, purchased of a woman who said that "she had cured thousands" through the use of the powders which were prepared from a secret formula by herself. The father of the child asked for an investigation, as it was thought possible that her death might have been hastened by the medicine. The jury decided that the fatal result was "due to exhaustion from the disease," but added that death was "superinduced by the drug," and censured the woman "for selling the article when she would not make known its ingredients." The amateur doctress escaped very easily, but it is quite surprising how lenient the law is in dealing with proprietary medicinal interests. Perhaps the new medical council will correct this after January first of next year.

Among recent changes of appointments we observe at the University that Dr. Chas. B. Penrose has been appointed the successor of Prof. Goodell as Clinical Professor of Gynecology. At the Medico-Chirurgical College, Dr. L. Webster Ford was made Professor of Ophthalmology and J. Madison Taylor, Professor of the Diseases of Children. Dr. Wm. F. Waugh's name appears in the new announcement as Honorary Professor.

The annual competitive examinations for the post of resident physician at the Philadelphia Hospital, attracts considerable attention on account of the rivalry of the schools and because it is taken as a public test of ability and attainments of the students. At the recent examination there were 119 candidates. Of these seventy were from the University of Pennsylvania Medical Department, nineteen from Jefferson, twelve from the Medico-Chirurgical, twelve from the Woman's College, and the rest were from schools outside of Philadelphia. Nearly all of these attained the required average of seventy, but the rule is that the first sixteen are at once elected, and the rest are called to serve in the order of their standing, as vacancies occur. During last term not less than twenty-four residents were thus appointed. The honors of the examination were pretty even; Jefferson got number one, the University got the largest number of appointments, and the Medico-Chirurgical claims the highest scholarship average of those sent up; the ratio of appointments to applicants is as follows: University, seventy applicants, ten successful, ratio one in seven; Jefferson, nineteen applicants, two successful, ratio one in nine and one-half; Medico-Chirurgical, twelve applicants, two successful, ratio one in six; Woman's Medical, twelve applicants, two successful, ratio one in six. It rarely happens that the results of a competitive examination meet with such approval; cause such general satisfaction.

BOOK NOTICES.

We have received a copy of the second edition of DR. W. W. KEEN'S operation blank, published by W. B. Saunders, Philadelphia. These blanks are extremely useful to all operating surgeons.

A Medical Handbook for the Use of Practitioners and Students. By R. S. AITCHISON, M.B., C.M., F.R.C.P.E. Illustrated 16mo. Flexible covers, morocco. London: Chas. Griffin and Co.; Philadelphia: J. B. Lippincott and Co. 1893.

This book, as is stated in the preface, is intended to be a companion to Caird and Catheart's Surgical Handbook. Particular attention has been given to the practical diagnosis and to the clinical classification of disease. In treatment of disease the author has recommended the use of only such remedies as are known to be beneficial. Medical handbooks are not to be encouraged in the place of the more thorough works on the subject, and should not be used by students except as a means of rapid reference, yet this book is one of the most complete of its kind that has come to our notice; and that much talked of individual, the busy practitioner, will often turn to its pages for a ready peg on which to hang his diagnosis and theory in a case where his library is not immediately accessible.

Stricture of the Urethra. By G. FRANK LYDSTON, M.D. Cloth, pp. 334, price $3. Chicago: The W. T. Keener Co. 1893.

Naturally the book opens with a chapter on the anatomy of the part involved, next on instrumentation, a very important chapter; then follow definition, location, morbid anatomy, causes, symptoms, diagnosis, prognosis and treatment. Chapters eight to thirteen are devoted to treatment, which necessarily includes a discussion of different methods. The author prefers Otis' dilating urethrotome to other instruments of the kind, and in regard to electrolysis he takes a very moderate ground. While relating a case, and stating that there are some cases favorably influenced by this method, he regards the extravagant claims as disproved, and in fact the whole matter as *sub judice*. The illustrations are excellent, and barring the italics, and a constant desire to grind some imaginary antagonist into powder, the author has produced an excellent book, one which gives the latest views on the subject and well represents the approved methods of treatment. We hope it may have an excellent sale.

Hypnotism, Mesmerism and the New Witchcraft. By ERNEST HART. 8vo. cloth, pp. 182. New York: D. Appleton and Co.; Chicago: A. C. McClurg and Co.

In this little book Mr. Hart has brought together in his entertaining style his own papers on the subject which have appeared in the *Nineteenth Century* and the *British Medical Journal*. He dissipates many popular errors, and unmasks the impostors who played their part well at La Charité. His controversy with M. Luys at Hôpital Charité is skillfully managed, and the book is well worth reading. The simple methods by which the impostures of Jeannie and Mervil were exposed will be valuable when making similar investigations elsewhere.

The Health Resorts of Europe. A Medical Guide to the Mineral Springs, Climatic Mountain and Seaside Health Resorts, Milk, Whey, Grape, Earth, Mud, Sand and Air Cures of Europe. By THOMAS LINN, M.D. 8vo. cloth, pp. 330. New York: D. Appleton and Co.; Chicago: A. C. McClurg and Co.

This book, as its rather lengthy title page shows, is a guide book to the various health resorts of Europe, but it goes farther; it specifies particularly the therapeutic indications which should govern the choice of particular localities. These are necessarily based on the especial claims of the different resorts themselves, and are usually too emphatic to be true. The book is not equal in interest to the book of Dr. Thomas Madden Moore on "Change of Climate," but as a directory is extremely valuable.

Immigrant Record for June.—During the month of June there arrived at the ports of the United States from the principal foreign countries, except the British North American possessions and Mexico, 67,726 immigrants, and in June, 1892, 73,120. During the twelve months ending June 30, 1893, the number of immigrants were 497,936, and during the corresponding period of the preceding year, 619,320. Of the number arrived during the twelve months ending June 30 last, 96,313 came from Germany, a decrease of 34,309; from Italy, 72,403, an increase of 11,459; from Sweden and Norway, 53,872, a decrease of 3,281; from Russia (except Poland), 43,657, a decrease of 40,631, and from the United Kingdom, 108,716, a decrease of 8,352.

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SATURDAY, JULY 29, 1893.

THE CLINICAL APPLICATIONS OF PANCREATIC EXTRACT.

The most recent work on the subject of therapeutics, PROF. HAYEM'S Lecons de Therapeutique (Paris, 1893, Tome iv), refers to pancreatin as "a variable product still more poorly defined than pepsin," and directs attention to the fact that the diverse preparations found in the stores are often inert. In closing his consideration of the subject the author emphasizes his previous remark by stating that "all the practical difficulty consists in procuring a good preparation." Fortunately for the profession in this country, the manufacture of pancreatic extract (or so-called pancreatin), is in the hands of well known manufacturing pharmacists, whose reputation is a sufficient guarantee for the excellent quality of their goods. So that it is entirely within the power of prescribing physicians to obtain therapeutically active pancreatic preparations, if they desire to do so, just as it is in the parallel case of pepsin.

Before considering the clinical uses of pancreatic preparations, it may be well to very briefly review the physiological data which serve as a guide to their rational application. In its physical structure the pancreas is very similar to the parotid gland, and is sometimes referred to as the salivary gland of the abdomen. The analogy, however, does not extend to its secretion, which is considerably more complex than the saliva. Human pancreatic juice is limpid, according to HERTER, and contains 976 parts of water per thousand. The organic substances are contained in an alkaline medium, the alkalinity being due to phosphates and carbonates, especially of soda. The extract of pancreas, or pancreatin (precipitated from watery solution by alcohol, or extracted by ether), forms with water and an alkali, an active, digestive fluid, having the same properties as the pancreatic juice. HALLIBURTON states[1] that "the organic substances present in the pancreatic ferment are: *a.* Ferments: These are the most important, both quantitively and functionally, of all the constituents; they are four in number: 1. Trypsin—a proteolytic ferment. 2. Amylopsin or pancreatic diastase—an amylolytic ferment. 3. Steapsin—a fat-splitting ferment. 4. A milk-curdling ferment. *b.* A small amount of proteid which is coagulable by heat. *c.* A mucin or mucin-like substance. *d.* Traces of leucin, tyrosin, xanthin and of soaps, have been described."

[1] Text Book of Chemical Physiology and Pathology. By W. D. Halliburton, M.D., London, 1891.

The fact that pancreatic secretion dissolved coagulated white of egg was observed by BERNARD and later by CORVISART, but KUHNE first isolated the special ferment, to which he gave the name of trypsin. This is "a proteid, or a substance closely allied, or adherent, to a proteid" (HALLIBURTON). Amylopsin, which resembles the ptyalin of the saliva in its property of converting starch into maltose, was first described by VALENTINE. It is said to be absent from the pancreatic secretion of new-born children, which explains the intolerance for starchy foods often found at this period. Amylopsin acts better in the presence of bile than by itself. The steapsin or fat-splitting ferment has never been separated, its presence being simply inferred from the action of the pancreatic juice on fats, and the same is true of the fourth, or milk-curdling ferment, from its action upon fresh milk.

The analogy of trypsin to pepsin has already been noted; but certain differences are to be observed. For instance, trypsin acts in an alkaline, pepsin in an acid solution. Trypsin acts more rapidly than pepsin, but the same series of proteoses can be detected as intermediate products in the formation of peptone. An albuminate in the nature of alkali albumin is formed in tryptic digestion; on the contrary, one of the nature of acid albumin is formed in peptic digestion. Trypsin acts more powerfully than pepsin on certain of the albuminoids difficult of digestion, such as elastin, and waxy or albuminoid substance. It digests nuclein, which is not attacked at all by gastric juice. Keratin and chitin are, however, indigestible by both ferments. Trypsin acts further than pepsin, decomposing the hemi-peptone into simpler products, of which the most important are leucin and tyrosin, asparaginic acid, ammonia and proteinchromogen. (HALLIBURTON, loc. cit.)

In regard to the conditions in which the therapeutic employment of pancreatic extract would prove advantageous, it would seem natural to place in the front rank those cases of digestive or nutritive disturbance arising from impairment or temporary suspension of the function of the pancreas. When this condition is present, the fatty matters fail to be emulsified or saponified, and appear unaltered in the feces. Claude Bernard found that the bile alone

only gave a light brown color to the feces, whereas when the pancreatic juice was also present the color was a distinct brown. Therefore, light colored discharges from the bowels are an indication of a failure in the pancreatic secretion. Since intestinal digestion of both proteids and carbohydrates depends upon the pancreatic juice, at least in great measure, we may regard intestinal dyspepsia also as one of the symptoms of pancreatic disorder. General emaciation may occur and this becomes most marked in malignant disease of the pancreas, which is usually accompanied by severe dyspeptic symptoms, with persistent nausea and vomiting and obstinate constipation. In acute affections of this organ, these symptoms may appear suddenly and be accompanied by great prostration or collapse. The so-called "cœliac affection" of children, characterized by the passage of large, loose, white or grayish, frothy and intensely fetid motions, is, in the opinion of DAWSON WILLIAMS, "most probably due to a temporary suspension of the functions of the pancreas." It has also been observed that this organ is atrophied in cases of diabetes, but whether as cause or concomitant of the disease has not been finally settled; although LANCEREAUX endeavored to constitute a special variety of diabetes, in which "there is degenerative disease of the pancreas, accompanied by perhaps in all cases, diseases of the cœliac plexus. This is said to be characterized by a rapid course, diarrhœa and greasy stools containing scraps of undigested, nitrogenous food."

In our clinical application of the above facts we find a physiological phenomenon unexpectedly limiting the usefulness of pancreatic preparations. It is that the activity of the ferments of the pancreatic secretion are destroyed by contact with the acid gastric juice, as in fact they are by any other acid medium. UNNA endeavored to overcome this by coating pancreatic pills with keratin; but unfortunately it was found that they not only escaped digestion in the stomach, but traversed the entire digestive tract with equal immunity. BOAS has suggested that pancreatic extract is particularly indicated in cases of suppression of the gastric secretion. This corresponds with the condition termed *apepsia*, where, as HAYEM points out, "apeptic patients empty their stomachs rapidly and the intestine has to bear the entire burden of digestion. If the pancreatic secretion and bile be normal and adequate, if the intestine functions well performed, there is no need to interfere; but should symptoms of intestinal indigestion supervene, pancreatic preparations may be prescribed with confident assurance of improvement." In some forms of entero-colitis it has also been used with advantage and particularly the entro-colitis of hot countries. In the latter case, it is very possible that the alkali which always should accompany the dose of pancreatic extract, may render the contents of the intestine less irritating, while assisting the action of the pancreatine in digesting and removing food material which is keeping up the disturbance. In ordinary constipation or diarrhœa with light colored motions, the pancreatic extract may be given. If the dose be administered when the stomach is free from food and especially if a preliminary dose of bicarbonate of sodium be administered, it is quite probable that the ferments will reach the intestine without their activity being at all impaired. In regard to the cases of diabetes mellitus to which LANCEREAUX directs attention, extractum pancreatis merits a trial, more especially since good results have been reported from the administration of other ferments such as yeast and of diastase. In general, whenever there is reason to suspect fatty degeneration, cystic change, atrophy or occlusion of the duct of the pancreas, it appears rational to administer pancreatic preparations to supply the deficiency of the normal secretion.

Trypsin, which may be regarded as a purified pancreatic extract has been applied as a digestive agent to diphtheritic exudations and has been injected into the bladder for the purpose of dissolving blood clots. A good solution may be made of the strength of half a drachm each of trypsin and of bicarbonate of sodium with a drachm of glycerin to the ounce, of water of the temperature of the blood. In employing this solution in diphtheria, a small proportion of bichloride of mercury (gr. $\frac{1}{4}$ to the oz.) may be added as recommended by DR. SAMUEL JOHNSON; the application to be followed by free spraying of the affected part with peroxide of hydrogen, properly diluted. In some morbid growths the parenchymatous injection of trypsin, alone or in combination with other remedies, might prove advantageous.

DR. WILLIAM A. HAMMOND in a recent lecture upon the novel preparations known as "animal extracts," proposes to appropriate the term pancreatine to the product of the pancreas, prepared in a peculiar manner. If these remedies come into general use, the term "Pancreatine" can be reserved for DR. HAMMOND'S product, and the proper term of extractum pancreatis given to the mixed ferments of established therapeutic value, now before the profession.

ARMY MEDICAL EXAMINATIONS.

During the past week the Surgeon General issued a Circular of Information for candidates seeking appointment in the medical corps of the army. This gives an account first, of the advantages as to rank, pay, emoluments and privileges which the military service offers to eligible young men. The method of making application for permission to appear

before the board for examination is then described: "The candidate must be a citizen of the United States, between twenty-two and twenty-eight years old, of sound health and good character, and a graduate of some regular medical college, in evidence of which his diploma will be submitted to the board. The scope of the examination will include the morals, habits, physical and mental qualifications of the candidate, and his general aptitude for service; and the board will report unfavorably should it have a reasonable doubt of his efficiency in any of these particulars." The circular closes with a series of written questions illustrative of the general character of the examination which the candidate has to undergo. The sample questions are taken from the records of a board recently in session in New York city and cover the subjects of arithmetic, geography, history and literature, chemistry, physics, anatomy, physiology, surgery, hygiene, pathology and bacteriology, therapeutics, materia medica and toxicology, practice of medicine and obstetrics and diseases of women and children.

The circular refers to the establishment of the Army Medical School for the benefit of the passed candidate, and to the intention of the Surgeon General to recommend the assignment for duty as attending surgeons in the principal medical centers of the United States of the medical officers who have not yet passed their examinations for promotion to a majority. It also provides for a preliminary examination into the physique and general education of a candidate at the military post nearest his home, to save him in case of failure the needless expense of travel to the city in which the board is convened. At every session of the examining boards many candidates have been rejected for defective physique or elementary education. These men should indeed never have become candidates, and Surgeon General Sternberg now proposes that only those who need have no fear of being rejected on these preliminary, but essential grounds, shall be put to the expense of travel for examination by the board.

The examining board to be convened next autumn will probably meet in Washington, D. C., and be composed of the faculty of the Army Medical School.

CONCEALMENT OF EPIDEMICS.

If any lesson has been thoroughly learned by the sanitary authorities of the United States, it is that concealment of the first cases of contagious disease is a dangerous and costly practice. We observe that the authorities of Naples are now making denial of the existence of cholera. Marseilles and Toulon similarly denied its existence until the deaths from the disease became so numerous that it could no longer be concealed. The policy of concealment is always adopted under specious pleas of the damage to commerce, the carrying trade and travel. It induces false security on the part of the local inhabitants, and is cruel to those who unwittingly get caught in the trap. Worse, however, by encouraging free ingress to the stricken city, and having no inspection of those going out of it, the epidemic is made more violent in the place itself, and spreads to a greater number of places. Hamburg tried the concealment plan, as long as it would deceive anybody, and it was the knowledge of the European tendency to hide the ravages of contagious diseases that induced Congress to pass the law providing for foreign inspection service. It is only fair to the city of Naples to state that the probabilities of a great epidemic there at this time are at a minimum. The great improvements in the streets, the miles of new pavements, the opening up of new and broad thoroughfares through former squalid tenement house districts, have greatly improved the situation since the great epidemic of 1887–88. The drainage is excellent and the drinking water good, but meanwhile our own sanitary authorities will do well to place credence in the reports of our own government inspectors in preference to biased local reports.

MUNICIPAL AUTHORITY OVER ADULTERATIONS.

One of the chief functions of a municipal government, whether wisely exercised or not, is to protect the health of its subjects. With its constitutional authority physicians ought therefore to be somewhat familiar. In the case of the State v. Fourcade, recently decided, the Supreme Court of Louisiana says, in discussing the constitutionality and legality of an ordinance of the City of New Orleans concerning the adulteration of milk, that a legislature may delegate to municipal corporations power to adopt and enforce ordinances of special local importance, though general statutes exist, relating to the same subjects. An ordinance must be authorized, and must not be repugnant to a statute over the same territorial area, but if there be no other conflict between the provisions of the statute and ordinance, save that they deal with the same subject, both may be given effect. The resulting or correlative doctrine is now too firmly established to admit of serious question—that the same act may constitute two offenses, viz., a crime against the public law of the State, and also a petty offense against a municipal regulation. The public welfare, requiring the maintenance of peace and good order, as well as of careful sanitary regulations, in cities and towns, renders summary proceedings, in many cases a necessity; and such are commonly secured by municipal regulations. Violations of municipal ordinances constitute a class of offenses that are, in general, throughout the country proceeded against summarily, and the right of trial by jury in connection therewith, cannot be constitutionally de-

manded. An ordinance is not, in the constitutional sense, a public law. It is a mere local rule or by-law—a police or domestic regulation—devoid in many respects of the characteristics of the public or general laws. In this case a city ordinance was attacked as being unconstitutional, illegal, and violative of the laws of the State; the specific objection made being that the State having adopted a standard of adulteration, it was the duty of the municipality to have made its standard identical with that of the State, and that, the two standards not being identical that of the city, by reason of that fact, was illegal. But, as already explained, the offense charged under the city ordinance would be a separate and distinct offense from that which would have been charged under the State law, while the State's standard would be applicable exclusively for and as descriptive of a State offense. Where the same act constitutes two offenses against separate jurisdictions, it is analogous to those cases where the same act is punishable under a congressional statute and also under a State law. The two offenses in such a case being different, each may be punished without violation of the constitutional inhibition against placing one twice in jeopardy for the same offense. These views are sustained by many authorities. And the general assembly of Louisiana in conferring upon the common council of New Orleans the powers it did in its charter, must have contemplated that it would adopt a standard of adulteration as to drinks; and that adopted by it not being shown to be unreasonable or arbitrary, or as passing beyond a fair measure of correction for the evil against which it seeks to guard, must be upheld.

DOMESTIC CORRESPONDENCE.

Report on Cheese Poisoning Cases at Mansfield, Ohio.

To the Editor:—In reply to your favor of July 14th, regarding a report of the so-called "cheese poisoning" in this city, I beg leave to say that the reports in the newspapers in reference to it were as usual very much exaggerated. It is true that we had some fifty or sixty persons who had eaten a certain make of cheese who were taken suddenly and violently sick, but with no fatal results. The cheese in question was made by Mr. Mabee who lives about five miles from this city and who has manufactured cheese for some thirty years and sold it in this city without any bad results, so far as we have any knowledge, until this occurrence which you refer to took place.

On investigation we learned that Mr. Mabee purchases milk from the farmers in his immediate vicinity, and as a rule, makes three cheese a day which weigh from twenty-four to twenty-five pounds each. The cheese of each day is numbered the same, and on this occasion the cheese, which were all made from the same curd, were numbered 55. One of the three was sold to a grocer by the name of J. P. Hering who retailed the entire cheese within twenty-four to thirty-six hours after he received it; on investigation we found that *everybody who was taken ill with the peculiar sickness had eaten cheese, but that everybody who had eaten cheese did not get sick;* but the sickness *all occurred* among those who had bought and eaten of this particular cheese which was very spongy and moist; two pounds of which I obtained of those who had bought and eaten of the cheese, and were taken sick shortly after eating it. Those two pounds were sent to Secretary D. C. O. Probst of the State Board of Health who turned it over to the State Dairy and Food Commissioner, Dr. McNeal, who with an expert cheese maker, Mr. Hurd, visited this city and examined into the character of the symptoms of those who were taken sick, together with the process employed in the manufacture of the cheese.

The second cheese was sold to a grocer by the name of P. P. Ford with the same results as in the former case, except that he did not sell more than *half* his cheese before he learned of the poisonous results from the use of it, and stopped its sale immediately. It is only just to say that the first groceryman had sold all his cheese before he learned that it was making any one sick.

The third cheese was sold and has been taken to Columbus for chemical analysis, a report of which, together with an analysis of the samples sent previously, will be sent me later on.

In this investigation it was interesting to note that the two grocerymen who bought the cheese lived in widely different sections of the city and that the number of cases of sickness corresponded with the amount of cheese sold; in other words, there were more than twice as many cases of sickness occurred in the Hering district where the *entire cheese* was sold, than there were in the Ford district where only *half* the cheese was sold. It is also interesting to note that the degree of sickness depended on two particular factors. First: The amount of cheese eaten. Second: the physical strength of the person who ate it. In every instance where children, or old persons who were feeble, had eaten the cheese they were afflicted much more seriously and in some instances they were so prostrated, especially in the case of the aged, that their lives were despaired of; whilst another who was strong and hardy and ate of the same cheese in the same quantity was not nearly so sick, if sick at all, whilst others were more or less affected according to the amount of cheese they had eaten and the physical strength they had to counteract the effects of the alleged poison.

One very interesting case occurred in which the mother had been taken sick from eating the cheese and shortly afterward her nursing babe which had been nursing her, was taken sick with the same symptoms, although it had not eaten any of the cheese at all; showing that the poison which produced the sickness was not only a local irritant to the stomach, but also assumed a constitutional character and was eliminated through the lacteal glands. The symptoms were those of marked prostration in the more serious cases and modified according to the amount of cheese eaten and the strength of the person who ate it; consisting of a marked reduction of the cardiac force, showing a partial failure or paralysis of the heart; some of the cases being entirely pulseless with cold hands and feet and cold perspiration, followed by vomiting and later by purging and general prostration. These symptoms obtained in every case to a greater or less degree, so far as we were able to learn from the patients and their attending physicians.

As to whether the poisoning was the result of Vaughn's tyrotoxicon remains to be determined by the chemical analysis which will be immediately instituted by Commissioner Dr. McNeal.

These cases of so-called "cheese poisoning," the result of eating certain cheese, have been of quite frequent occur-

rence in this vicinity. In 1888 and 1889 I sent samples of cheese to the State Board of Health from this city which were supposed to contain tyrotoxicon, but on investigation by Professors Howard and Webber of Columbus and Prof. Schweintz of the Bureau of Animal Industry of Washington, they were unable to find Vaughn's tyrotoxicon in a single instance, notwithstanding they followed the directions given by him for its detection. Experiments were conducted by Prof. Webber at that time by feeding animals with the poisonous extracts of cheese, with no results. But these experiments on animals are very questionable, as we are all aware that animals can, as a rule, eat decomposed organic matter without any serious results; while on the other hand, if eaten by humans, it would produce sickness if not fatal terminations. The fact that tyrotoxicon was not found in the cheese was no evidence that a poisonous compound, the result of fermentation, was not the cause of the sickness; and especially is this true, as Prof. Vaughn has found poisonous substances in cheese since his discovery of tyrotoxicon, which he claims are sometimes, under certain circumstances, the cause of sickness.

In this same investigation which I have referred to, and which was conducted by the State Board of Health in 1888, bacteriological examinations were made by Prof. Detmers with negative results. Of course, we may have fermentative products of an alkaloidal character which could not be detected by bacteriological examinations. The bacteriologist would only be capable of determining a fungus or a microbic toxicant, if such existed, but with alkaloidal products his investigations would prove futile.

Since these investigations by our State Board of Health, all of which resulted negatively so far as Vaughn's tyrotoxicon was concerned, the State Board of Health considered it useless to conduct any further investigations for that poison. Yet at the same time there is no question but what there is a "poison" of some character which occurs in the manufacture of certain kinds of cheese, which is evidently the result of *fermentation*, and while it may not always be tyrotoxicon, it is possible that under certain circumstances it is; and under others it is certainly some compound analogous to tyrotoxicon which as yet has not been discovered, and which will be sought for in the chemical analysis to be instituted by the State dairy and food commissioner, the result of which we will watch with great interest, as it is to be hoped that he will be able to discover the cause, origin and composition of the substance which produces these perplexing outbreaks of so-called "cheese poisoning" which usually occur in this section of the country in the summer and fall, so far as I have been able to observe, and usually occur in cheese that is made during the hot weather.

That this is the result of fermentative changes is certainly quite evident. First: for the reason that brands of cheese which are made from pure, sweet milk and are made without any fermentation except that particular ferment produced by the use of *rennet* for curdling the milk, does not produce "cheese poisoning." Second: that "cheese poisoning," so far as I have been able to ascertain, has occurred in those brands of cheese which are subjected in their manufacture to certain fermentative changes, either *purposely* or *accidentally*. Very respectfully submitted,

R. HARVEY REED, *Health Officer.*

Advertise in the Journal.

SAGINAW, MICH., July 17, 1893.

To the Editor:—Will you kindly furnish me the address of the firm who handle the sterilizer that was on exhibition at Milwaukee? Yours, S. A. MCLEAN,

Bay City, Mich.

State Board of Health of Pennsylvania.

PHILADELPHIA, July, 1893.

To the Editor:—The recent session of the legislature of this State was marked by an unusual interest in all matters pertaining to the protection of the public health. A step of great importance was the passage of an act making the establishment of Boards of Health compulsory in all incorporated boroughs in the State. As these Boards are by the terms of the law required to report to the State Board of Health, we may hope that in the course of the next six months, the sanitary organization of the State will be so complete that the State Board will have accurate and early information of all outbreaks of contagious disease. Although the legislature declined to increase the very meager appropriation to the State Board of Health, it granted the request of the Board to appropriate the sum of $50,000, to be used in case of serious emergencies, with the approval of the Governor. In the event of the advent of cholera, this will enable the Board to take immediate and effective action to check its spread.

Another measure of considerable importance was the establishment of a State Quarantine Board, to which is assigned the control of maritime quarantine at the Port of Philadelphia, which includes all ports of entry on the Delaware river above the State line. This Board is constituted as follows:

The President of the College of Physicians of Philadelphia or a member of said college to be designated by the President;

The Secretary of the State Board of Health;

The President of the Philadelphia Maritime Exchange or a member of said Exchange to be designated by the President;

The Health Officer of Philadelphia appointed in pursuance of the Act to which this is a supplement;

The Quarantine Physician provided for in this Act;

A sixth member to be appointed by the Mayor of Philadelphia;

A seventh member to be appointed by the Governor of Pennsylvania.

The aim of the new Board is to act in harmony with the quarantine authorities established at the mouth of the Delaware Bay by the United States Marine Hospital Service. The protection to this port will be threefold: First, the United States Marine Hospital inspection and hsspital service near the Delaware breakwater. Second, the United States Marine Hospital disinfecting plant at Reedy island, forty miles higher up the bay, and third, the State quarantine station, established at the old Lazaretto, a short distance below the city of Philadelphia.

The purpose is to have such intimate coöperation between the several stations, that absolute protection will be assured with the least possible interference with commerce and travel. With this triple cordon of coast defence, combined with the system of train inspection which our Board is arranging in connection with the United States Marine Hospital Service, and the appointment of a Supervising Inspector in each county for special service in the presence of cholera, our Board feels that it is quite ready for any emergency which may occur.

Another Act passed which promises valuable results in the future, was that establishing a State Board of Medical Examiners on which the State Board of Health is represented in the person of its president. A communication just received from Berlin, informs me that large numbers of diplomas of the so-called American University of Philadelphia, bearing the signature of the infamous John Buchanan, and issued by one Charles Sayer, in London, at the moderate price of $10 apiece, are being obtained at the present time in Germany. As is well known, in this country, this fraudulent institution, together with others of a similar char-

acter, were stamped out by the courts in this city in 1880; and yet it is evident that they are still making the name, "American Graduate" a stench in the nostrils of the German public. It is sincerely to be hoped that medical examining boards will soon be the rule in every State in the Union, and that in this way we shall be able to blot out this shameful reproach.

Bills for preventing the adulteration of food and drugs, and for the regulation of the sale of milk and of meats were unfortunately either lost in the Assembly or vetoed by the governor. The health of school children was considered in an Act which became a law, compelling school boards to make proper sanitary arrangements in all schools under their jurisdiction.

On the whole, therefore, sanitarians have a right to congratulate themselves that this old commonwealth is slowly arousing from its lethargy in regard to this most important of all governmental questions, the protection of the public health. Yours respectfully,

BENJAMIN LEE, *Secretary*.

State Board of Health of Pennsylvania.

The Woods are Full of Them.

LOUISVILLE, KY., July 21, 1893.

To the Editor:—Can you recommend a good and honest lady or gentleman to canvass subscriptions for two old, established magazines on a liberal commission?

Your early reply will oblige

Fraternally yours,

PAUL KRATZ, Publisher.

NECROLOGY.

Edward Loomis Smith, M.D., of Seattle, Washington, was found dead in his bed on the morning of July 12, 1893. The end came quietly and peacefully as he had often expressed a wish that it might. He had been a sufferer from heart disease for many years so his sudden death was no surprise to his most intimate friends.

Dr. Smith was born at Pittsford, Munroe county, New York in 1840, and received his literary training at the Genesee Wesleyan Seminary, at Lima, N. Y. He took two courses at the Medical Department of the University of Buffalo, and afterwards received the degree of M.D. from the Cooper Medical College at San Francisco, California. He served as a medical officer with the Twelfth United States Infantry at Angel Island, California, during 1873 and 1874, after which he practiced in the towns of Quincy and Laport, California, coming to Seattle to locate in 1877.

His genial disposition and open generosity, together with his professional ability, soon won for him a host of friends and made him one of the best known surgeons in the Pacific northwest. He inspired confidence in his patients and was always kind to his brother practitioners. His surgical experience was very extensive, he having been chief surgeon at Providence Hospital for many years.

He was one of the organizers of the King County Medical Society and was the first president of the Washington State Medical Society; he was also a member of the Seattle Medical and Library Association, California State Medical Society and the American Medical Association.

Dr. Smith always took great interest in the State militia, having served as brigade surgeon and surgeon general on Governor Ferry's staff. He held the same position on Governor McGraw's staff at the time of his death and was buried with military honors. J. B. E.

SOCIETY NEWS.

Official Delegates to the Pan-American Medical Congress.—Practically all of the governments have appointed official delegates to the Congress in response to the invitation by the President of the United States. The United States government will be represented by six delegates. The larger cities of all the Latin-American countries have appointed delegates to participate in the proceedings of the Sections on Hygiene, Climatology and Demography, and on Marine Hygiene and Quarantine, and similar appointments will be made by the cities of the United States. Seventy-six similar delegates have so far been appointed by the governors of States in the United States. A large number of delegates have been chosen by the medical colleges of the United States and other American countries to attend the Section on Medical Pedagogics, under the presidency of Professor J. Collins Warren of Boston.

Dr. Ernest Hart, editor of the *British Medical Journal*, and Prof. Dr. Czerny, of Heidelberg, will be among the distinguished guests. The latter is booked for the Pan-American excursion to Rome by the "Werra."

Section on Materia Medica and Pharmocology, Pan-American Medical Congress.—A Section on Materia Medica and Pharmocology has been organized under the executive presidency of Professor Joseph P. Remington of Longport, N. Y., with Professor F. G. Ryan, 3739 Brown St., Philadelphia, as English-speaking secretary. This Section promises to be one of the most important of the entire Congress. Delegates have been invited from all the pharmaceutical societies and colleges in all the Americas. Those contemplating attendance are invited to prepare papers on pharmaceutical topics. Titles should be sent at once to Professor Ryan, Secretary.

The Vermont State Medical Society will hold its Eighteenth Annual Meeting in Rutland, Oct. 12 and 13, 1893. The president is Dr. R. M. Wilder, Swanton; D. C. Hawley, Burlington, secretary; chairman committee of arrangements, Dr. C. S. Caverly, Rutland. The midsummer program can now be obtained from Dr. Hawley, and the regular program from that gentleman about October 1.

SELECTIONS.

Chloride of Sodium Infusion in the Fasting Insane.—That fatal termination frequently follows in the more severe melancholias notwithstanding the most careful artificial feeding is a fact within the experience of every alienist. It makes only a trifling difference in the progress of these cases, as to what efforts are put forth to vary the quality and quantity of food; the patient gradually emaciates, the secretions become foul, the bowels sluggish, and vomiting may occur after each use of the œsophageal tube. The patient rapidly grows weaker, finally dies from exhaustion notwithstanding that ample food is being ingested. Reference is not intended here to the class of cases where refusal of food is based on delusion and in which there is no somatic disturbance; these cases may be fed artificially for months or years without causing any special disturbance of the health. The brilliant results that have been achieved in surgery, obstetrics and internal medicine by the use of subcutaneous and intra-venous infusions of salt solutions have encouraged Ilberg (*Zeitschrift für Psych*) and Lehmann (*Centralblatt fur Nerenhkde und Psych*, June 1893) to try them in the severe melancholias accompanied by refusal of food. The latter writer reports four, in three of which results were achieved by the hypodermatic injection of 600 cubic centimeters of saline solution, The injections were made at intervals of two or three days according to the condition of the patient. After each injection the general state of the patient was markedly improved,

the lips would become moist, the tongue would clear and in several cases the patient would begin to take food voluntarily. In one case that terminated fatally, death was found to be due to a perforating ulcer of the stomach, due to swallowing a fragment of glass with suicidal intent.

Unilateral Hypertrophy of the Face.—D. W. Montgomery (*Medical News*, July 15, 1893) adds another case to the few reported of this extremely rare affection. Additional interest is found in these cases owing to the fact that the sensitive and motor nerves of the affected part come from different roots, and if we ever solve the nature and seat of trophic nervous influence it will probably be from a study of the nerve supply of these parts.

Some idea of the enlargement may be gained by the statement that the distance from the philtrum to the tragus is six and one-eighth inches and only four and seven-eighths on the right or unaffected side. The bones as well as the skin and its appendages were hypertrophied, the hairs were coarse and heavy and the mouths of the sebaceous glands large and patulous giving the skin a "saddle leather" look. Portions of the skin removed for microscopic study showed an extremely friable condition of the chorion which was enormously increased in thickness, and round-celled infiltration along the vessels. The dilated sebaceous glands in many cases contained masses of concentrically arranged epithelial cells that had undergone hyaline degeneration. These masses produced tumor-like elevations of the surface, and seemed to act like foreign bodies as the surrounding connective tissue was richly infiltrated with small round cells.

Trapacocaine in Eye Practice.—Dr. Ferdinands has given in the *British Medical Journal* his favorable estimation of the Java leaf cocaine. The anæsthesia produced by it in ophthalmolic use has been more reliable than the older drug, the effect is more enduring and may be attained in parts that have become inflamed. There was no appearance over the corneal surface of that haze that has been so often a troublesome consequent on anæsthesia by cocaine. A strength of two or three parts per hundred, in aqueous solution, has been efficient in the general run of cases, while a 5 per cent. strength was used safely for anæsthesial applications to the deeper seated parts of the eye. The solutions should be made with distilled water. They keep well and continue efficient for months. In only one case were untoward results observed, and in that case the surgeon used a 10 per cent. solution. There is virtually no mydriasis nor hemostatic action.

Unilateral Tremor Associated with Tumor of the Cerebral Peduncle.—Blocq and Marinesco (*Le Mercredi Medical* No. 22, page 269) furnish an additional uncertainty as to the origin of the tremor of paralysis agitans in the report of a case of that disorder in which a tumor the size of an olive was found in the midst of the right crus cerebri. The fibers of the oculo motor nerve, superior cerebellar peduncle and crusta all escaped. The tremor which was confined to the left side was believed by the writers to be due to irritation of the pyramidal fibers. This explanation seems gratuitous as the patient died from tuberculosis of the lungs and it is quite possible that the tumor bore no relation to the tremor. A careful study of the recent literature of paralysis agitans shows that the disease probably has its origin in the motor nerve endings. In this case we may have had a paralysis agitans with tuberculosis and secondary tumor of the crus.

A Study of Losophan.—In a thesis by Felix Descottes presented to the Paris Faculty of Medicine, the author formulates the following conclusions: In the treatment of leg ulcers, losophan acted quite as well as any of the medicaments customarily employed in this condition. In primary lesions of a syphilitic character, losophan had a very beneficial action and determined a rapid cicatrization of chancre, although employed to the exclusion of general constitutional treatment. The curative effects of losophan were especially manifested in simple chancre or soft chancre. Patients suffering from folliculitis and eczema, though not always completely cured under treatment by losophan experienced in all cases a great amelioration of the condition. In circumscribed lichen simplex, losophan successfully cured the disagreeable and often painful pruritus which almost always accompanies this malady. In prurigo with obstinate pruritus the same beneficent results was obtained. In the estimation of the author, these results are sufficient to enable us to classify losophan among the most efficient of our remedies for certain skin diseases. Dr. Descottes employed losophan in much stronger mixtures than those cited by other authors and never noted any irritation of the skin. He used 8 per cent., 10 per cent. and sometimes 20 per cent. ointments and occasionally the pure powder. Saalfeld used but 1 to 2 per cent. ointments or solutions. Descottes was successful in some conditions which had not heretofore responded promptly to losophan.

MISCELLANY.

Cholera.—Cholera has appeared in Naples. There were four fatal cases on the 16th and 17th of July. The diagnosis was verified by bacteriological examination. Its origin has not yet been traced.

The British steamer *Blue Jacket* from Marseilles, arrived at Cardiff July 19. It had cholera on board and was ordered in quarantine. The *Blue Jacket* sailed from Kertch, in the Crimea, June 24. It called at Constantinople and proceeded thence to Marseilles, from which port it came direct to Cardiff.

There were two cases of cholera on the *Blue Jacket*. Both patients are recovering. The other members of the crew are in a healthy condition.

The cholera is raging among the poorer classes in Moscow. The Director of Prisons upon learning that there was cholera in the Moscow prisons ordered a majority of the prisoners to be removed to four other cities, thus increasing the danger of a spreading of the infection. There have been no cases so far in St. Petersburg. In Polodia and other infected places the death rate has not lessened.

Must be Examined.—The Iowa State Board of Medical Examiners, is now sending out the following circular: The Announcement and Catalogue of your ——— for the session ——— is before me. I regret to find that your requirements for graduation do not conform to our "Schedule of Minimum Requirements," a copy of which, together with the resolutions adopted by the Iowa State Board of Medical Examiners relating thereto, are sent herewith. I have underscored the particulars in which you lack conformity. I am directed to say in advance, that unless your requirements for graduation are amended so as to be in complete accord "by announcement and practice, in letter and in spirit" with our schedule, as shown herewith, your graduates cannot be admitted to practice in this State, except upon satisfactory examination before this Board.

Respectfully, J. F. KENNEDY, M.D., *Secretary*.

COLLEGE NOTES.

Northwestern University Medical School (Chicago Medical College) has just completed a new laboratory building that is one of the largest and best in this county, and at a cost of $150,000. It is a five story structure, 106 feet wide by 110 feet long.

It contains, besides the usual offices, lavatories, lockers for students' clothing, etc., two large lecture rooms and one quiz room, laboratories of physiology, pharmacy, botany, pharmacology, normal and pathological histology, bacteriology, chemistry, anatomy and operative surgery, together with smaller rooms for special class instruction and indi-

vidual work. The entire building is wired for electric lighting, and is heated by steam throughout. There is hot and cold water in all rooms, compressed air and live steam in the laboratory and lecture rooms, an ice machine for cooling the room in which the anatomical material is preserved, and in which any desired temperature may be easily maintained.

It is expected that these laboratories, with the possible exception of the laboratory of physiological research, will all be in operation at the beginning of the coming term.

The new college building, in course of erection on the same lot, will be completed by the opening of the college year. It has been designed especially for clinical teaching. There will be two floors devoted entirely to clinics which will be in operation both forenoon and afternoon. There are two large amphitheatres on the same level as the clinic rooms, to be used for college clinics, as well as for didactic teaching.

This building is 55 feet wide by 106 feet long, and, in architectural features, corresponds with the laboratory building.

Rush Medical College.—In consequence of the number of foreign visitors to the city of Chicago during the year of 1893, many of whom have made inquiries relating to this college, a limited edition of the Announcement for this year has been issued in the French language.

Appointment.—Dr. Emory Lanphear of Kansas City, has resigned from the University Medical College and accepted the chair of Operative Surgery and Clinical Surgery in the Kansas City Medical College.

LETTERS RECEIVED.

(**A**) Anderson, Wm., Indiana, Pa.; Atkinson, W. B., Philadelphia, Pa.; Ames, L. L., Onaga, Kan.; (**B**) Burford, Wm. B., Indianapolis; Bacon, C. G., Fulton, N. Y.; (**C**) Corson, Hiram, Plymouth Meeting, Pa.; Carpenter, J. G., Stanford, Ky.; Cornick, Boyd, Knickerbocker, Tex.; (**D**) Dunglison, R. J., Philadelphia (telegram); (**E**) Eagleson, J. B., Seattle, W. T.; (**F**) Fogg, John S., Biddeford, Me.; Flesher, Paul, Elkhorn, W. Va.; Florentine, F. B., Saginaw, Mich.; (**G**) Grant, H. H., Louisville, Ky.; Gihon, Albert L., U. S. Navy; (**H**) Hamiell, E. K., Newark, N. J.; Hinde, Alfred, Chicago; Heckard, M. O., Chicago; Holmes, Bayard, Chicago; (**J**) Jenkins, J. C., Everett's, N. C.; (**K**) Kratz, Paul, Louisville, Ky.; Kern, W. B., Hastings, Neb.; (**L**) Lee, Benjamin, Philadelphia; Lynk, M. V., Jackson, Tenn.; (**M**) Mansfield Bookbinding and Index Co.; McLean, S. A., Bay City, Mich.; Montezuma, Carlos, Barry, Washington; McDonald, Mrs. S. M., Washington, D. C.; Miller, J. E., Providence, R. I.; McIntyre, J. H., St. Louis, Mo.; Malted Milk Co., Racine, Wis.; (**O**) Orleans Parish Med. Soc., New Orleans, La.; Owens, T. B., Roxbury, Mass.; Owen, A. M., Evansville, Ind.; Ochsner, A. J., Chicago; (**P**) Patterson, R. S., Port Huron, Mich.; Park, J. Walter, Harrisburg, Pa.; Parke, Davis & Co., Detroit, Mich.; Parr, Thos. S., Indianola, Ia.; (**R**) Rush, Jas. D., Apalachicola, Fla.; Reed, R. Harvey, Mansfield, O.; Rosenberger, J. S., Chicago; (**S**) Seymour, W. W., Troy, N. Y.; Schaufelberger, F. J., Hastings, Neb.; Sajous, Chas. E., Paris, France; Schieffelin & Co., New York; Shober, W. A., Ligonier, Ind.; Small, E. H., Pittsburgh; (**T**) Trabert, J. W., Annville, Pa.; Truax, J. G., New York; (**V**) Vauden, Geo., Caperton, W. Va.; (**W**) Waxham, F. E., Denver, Col.; Woodbury, Frank, Philadelphia; Wyman, Hal., Detroit; (**Y**) Young, Arthur, Prescott, Wis.

THE PUBLIC SERVICES.

Civil Practice by Army Medical Officers.—The following from a recent issue of a military journal shows that in France as in this country the civilian practitioner sometimes considers himself unjustly treated by his military colleague: "The French War Minister has decided not to permit French army medical officers to combine private practice with their military duty, except where they render medical service gratuitously, and as a rule they must confine their civil practice to assisting civil practitioners without competing with them. Hitherto medical officers, being duly qualified practitioners, have been allowed to practice their profession outside the army and the present decision is due to the objections of civil practitioners."

The U. S. Army Regulations of 1814, in which the duties of medical officers were for the first time distinctly specified, prohibited civil practice in these terms: "No surgeon of the army shall be engaged in private practice;" but this regulation has never been enforced. One officer inquired of Surgeon General Lovell concerning it and was informed that it was intended only to prevent neglect of duty, which might be occasioned by entering exhaustively into practice. At one time the physicians of Sackett's Harbor, N. Y., protested against the practice of the Post Surgeon of Madison Barracks, alleging that he came into injurious competition with them. The reply was to the effect that if no breach of professional etiquette nor any improper means to obtain professional employment was charged the War Department could not with propriety interfere in the matter. Medical officers had a right to give their services to whomsoever they pleased, and they had always been permitted to do so. Indeed, at small posts it was desirable that they should do so to extend their sphere of action and experience. The present ruling is that medical officers must not establish an office nor solicit practice, but if requested to attend in any case they are at full liberty to do so, provided it can be done without interfering with their regular duties. It would be ungracious and indeed unjust to citizens to deprive them by War Department orders of any benefit they might derive from the care of a military surgeon.

Immigrant Inspection Service.—Surgeon P. H. Bailhache, United States Marine Hospital Service, stationed at Ellis Island, is organizing a corps of several hundred physicians, whose services may be needed in the event of cholera reaching this port. If cholera does reach New York it is proposed to send one of these physicians on each immigrant train that leaves here. This physician will accompany the immigrants to their destination and watch them carefully for symptoms of contagious or infectious diseases. Already a large number of applications from physicians who want to serve on this corps have been received. This is the immigrant inspection service recommended by the Sanitary Council of the Mississippi Valley, and similar to the one organized by the late National Board of Health.

The Sick-Bay on the Cruiser New York.—The Surgeon General of the navy has recently made a report to Secretary Herbert on the apparently poor arrangements for the care of the sick on the new cruiser, *New York*. He hopes to have some of the defects remedied before the vessel shall be sent out on a cruise. The adopted plans locate the sick-bay too far forward near the magazine and torpedo tubes. Surgeon General Tryon urges that the sick should be placed amidship, or in some other part where they can have more room, light and air.

Army Changes. Official list of changes in the stations and duties of officers serving in the Medical Department, U. S. Army, from July 15, 1893, to July 21, 1893.

First Lieut. JAMES D. GLENNAN, Asst. Surgeon, ordered to report to the president of the examining board, for examination for promotion.

Major PETER J. A. CLEARY, granted leave of absence for four months, on surgeon's certificate of disability.

First Lieut. A. E. BRADLEY, Asst. Surgeon, ordered to report to Lieut.-Col. DALLAS BACHE, deputy Surgeon-General, president of examining board at Omaha, Neb., for examination for promotion to grade of Captain.

First Lieut. J. T. CLARKE, Asst. Surgeon, will on the abandonment of Camp Poplar River, Mont., proceed to Ft. Sully, S. D., for temporary duty, and on return of First Lieut. BRADLEY, proceed to and take station at Ft. Omaha, Neb.

Major CALVIN DEWITT, Surgeon U. S. A., is granted leave of absence for one month, to take effect between the 15th and 30th inst. Par. 2, S. O. 78, Hdqrs. Dept. of Texas, July 11, 1893.

Navy Changes. Official list of changes in the Medical Corps of the U. S Navy, for the week ending July 22, 1893.

P. A. Surgeon T. B. BAILEY, from Philadelphia Hospital, and to the U. S. S. "Machias."

Medical Inspector W. M. JONES, from League Island Navy Yard, and wait orders.

Medical Inspector G. H. COOK, to the Navy Yard, League Island.

Surgeon S. H. DICKSON, from Marine Barracks, and to the "Dolphin" temporarily.

Surgeon P. M. RIXEY, from the "Dolphin," and granted temporary leave.

P. A. Surgeon J. D. GATEWOOD, temporary dufy at Marine Barracks.

P. A. Surgeon A. R. WENTWORTH, from the "Atlanta," and granted leave.

Surgeon W. G. FARWELL, to temporary duty on the "Franklin."

Surgeon C. T. HIBBETT, from the "Franklin," and to the "Detroit."

Asst. Surgeon C. W. BROWNELL, ordered to receiving ship "St. Louis."